The Builder.

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Gas and Gas-lighting.

HE "perpetual fire" and "sacred lamps" of ancient Pagan mysteries are now believed to have been kept burning by natural and spontaneous supplies of carburetted hydrogen gas issuing from fissures in the earth overlying beds of asphalt or coal, or from or by petroleum springs. Among the records of remote ages, at all events, there are intimations of the existence of an inflammable air, the properties of which were sufficiently understood to admit of its being used as a source of heat and light; while even in modern times we know that Pagan and semi-civilized nations, such as the Burmese and Chinese, make use, as they have done for ages, of spontaneous outflows of inflammable gas, which the Chinese are said to convey through bamboo canes as "gas-pipes" to houses in the vicinity of the gas-spring. Amongst ourselves, too, in modern times, it has long been known, in connection mainly with coal-mining operations, that the earth yielded inexhaustible fountains of "fire-damp," which could be burnt in jets, and such jets have been so burnt for many years, as at the coal-pits near Newcastle, where, some years ago, we saw an immense pillar of fire in perpetual ascent from the lower regions.

It was not till 1658 that any scientific or careful examination of the nature and properties of fire-damp appears to have been instituted. In that year the result of some experiments on the gas issuing from a well near Wigan, in Lancaster, was communicated to the Royal Society by Mr. Thomas Shirley. In 1726 we next find mention of the presence of an "elastic inflammable air," in connection with coal, in certain experiments made by Mr. Stephen Hales, who had discovered the possibility of producing elastic fluids from coal and many other substances. In 1733, Sir James Lowther communicated a paper to the Royal Society upon the damp air issuing from the shaft of a coal-mine near Whitehaven, which some workmen were in the act of sinking. A rush of air suddenly burst forth at a depth of forty-two fathoms from the surface, and caught fire from a candle, shooting upwards into a flame 3 feet in diameter and 6 feet high. The workmen, in alarm, beat out the flame with their hats; but the steward afterwards went down and relit the gas, after further opening the black stone bed. It was now 9 feet high, and was with much difficulty extinguished. A tube (the first of our gas-pipes) was then provided to carry off the inflammable air to the surface, where it was made to project 4 feet above the top of the pit; and, at the time of reporting the circumstance to the Royal Society, this gigantic jet of gas had burnt for two years without diminution or cessation. Bladders had been filled with the gas, and these first of "portable gas" apparatuses were fitted with clay pipes, through which the gas issued, as burners. In 1739 the Rev. Dr. John Clayton, Dean of Kildare, made some experiments on what he called the "spirit of coal." He was one of the first (after Dr. Stephen Hales doubtless) who actually distilled coal in a close vessel. The gas thus obtained he burned from bladders in which it was collected. A stretch of a good many years—from 1739 to 1792, in fact—was expended, so far as gas-lighting was concerned, in various experiments on inflammable air chiefly as a subject of philosophical curiosity, and without immediate practical results, although latterly it became a common practice for amusement to shut up a small fragment of cannel or other coal in a tobacco-pipe with clay, insert the bowl into the parlour fire, and, when red hot, set fire to the gas as it issued from the pipe stalk. Attention had thus and otherwise been awakened to the subject and the way prepared for the "new light." Yet for nearly thirty years beyond 1792, the subject continued to be merely one of philosophical experiment, although, in 1792, Mr. William Murdoch, of Redruth, in Cornwall, had actually lit up his house and offices with gas, supplied from an apparatus of his own construction, and was thus the originator of the coal gas manufacture. More than that, this "hasty fruit before the summer" of modern invention at that time actually astonished his neighbours still further (and would have even surprised their descendants at the present day) by adapting the gas to the lighting of a small steam carriage for common roads, in which he himself rode to and from the mines which he managed, and which were situated at a considerable distance from his residence. In 1797, Mr. Murdoch had removed to Scotland, and soon had his premises, at Old Cumnock, in Ayrshire, also lighted with gas.

About the time Murdoch was so employed, a Mons. Le Bon was engaged in experiments on inflammable gas in France; and, in 1801, a son of James Watt, writing from Paris, urged his brother to make haste with Murdoch's light, as Le Bon contemplated lighting up a part of Paris with gas. In 1798, however, Murdoch had already constructed, at Boulton & Watt's manufactory, at Birmingham, an apparatus for the production of gas; and, in 1802, he publicly exhibited the light at each end of the manufactory, at the general illumination for the Peace of Amiens. The manufactory itself, nevertheless, was not even by that time lighted with gas, nor till about a year afterwards. At the Peace exhibition of the "Bengal light," as it was called, a pupil of Boulton & Watt's was present, and assisted, who afterwards identified himself with the history of gas-lighting, and may be said to have been one of the maturers of the manufacture, namely, Mr. Samuel Clegg, gas engineer, the inventor of the first gas-meter and governor, and of many other appliances in the realization and establishment of the gas manufacture as a commercial and economical substitute for lamps and candles.

Boulton & Watt, in 1805, lighted up some extensive cotton-mills in Salford with gas, under the direction of Mr. Murdoch, who gave an account of the apparatus to the Royal Society in that year, through Sir Joseph Banks, F.R.S. Simultaneously with the fulfilment of this contract, another was being carried out by Boulton & Watt at Halifax, under the direction of Mr. Clegg. In these cases the gas was not purified; and, to remedy this vital defect, Mr. Clegg, in the next manufactory he lighted (at Coventry), introduced lime as a purifier, which in one way or another has ever since held its ground as an important agent in gas purification.

The Roman Catholic College of Stonyhurst, in Lancashire, merits distinguished mention, as one of the earliest to adopt the new light,—a fact in strange contrast with the repugnance of the central authorities at Rome (till recently under Mr. Shepherd's able direction) to follow so excellent an example. The professors of Stonyhurst, it appears, afforded Mr. Clegg great encouragement in the making of experiments and the improvement of his apparatus, especially as regarded purification.

The successful experiments of Messrs. Boulton & Watt and their assistants attracted immediate attention. Philosophers, engineers, mechanicians, and capitalists were soon in motion: chemists busied themselves in the laboratory and at the lecture-table: engineers and mechanicians occupied themselves in devising the best forms of apparatus. The first specimen of street-lighting by gas was made by Mr. Windsor, in Pall-Mall, in 1807. This gentleman had lectured at the Lyceum Theatre, on the subject of gas-lighting, in 1803, the year after that in which the first public display of the new light took place at the Soho Works, Birmingham. He did an immense deal in persuading the Londoners and others of the practicability and superiority of gas-lighting; but he cannot be fairly called its original inventor.

In 1809 the first application was made to Parliament for an Act to incorporate a gas company, and in 1810 this company, "The London and Westminster Chartered Gas-light and Coke Company," was fairly established by Act of Parliament. In that year Ackerman's premises, in the Strand, were lighted with gas, but not by the Chartered Company. The lighter of Ackerman's, however (Mr. Clegg), was engaged by that company as their engineer, in 1813, previous to which time Messrs. Windsor, Accum (of "Death in the Pot" celebrity), and Hargraves, were employed in the erection and management of their works. Much had to be afterwards done, however, ere the first gas company was fairly set agoing, and lighting a town was even still thought to be a visionary scheme. Davy, the celebrated chemist, considered it so ridiculous, that he asked Mr. Clegg if it were intended to take the dome of St. Paul's for a gas-meter; and Scott, the novelist, entertained his friends with jokes about the absurdity of lighting London with smoke.

Houses and shops were first fitted up and supplied, by the Chartered Company, free of expense, by way of advertisement. For nearly two years this was continued.

It was believed that the pipes conveying the gas must be hot; for, when the passages to the House of Commons were lighted, the architect insisted on the pipes being placed 4 or 5 inches off the wall, for fear of fire, and the curious often applied their gloved hands to the pipes to ascertain their temperature. A lady of rank was so delighted with the brilliancy of a gas-light, on Mr. Ackerman's counter, that she offered him any money he might charge for it if he would allow her to take it home with her in her carriage for the illumination of her mansion.

On the 31st of December, 1812, Westminster Bridge was lighted with gas, and it soon became an object of attraction, and while the novelty lasted, the bridge was a fashionable promenade; but the lamplighters were so disgusted with the new system, that they struck work against it! and the Chartered Company's engineer, Mr. Clegg, had to act as lamplighter himself.

The parochial authorities of St. Margaret's, Westminster, were the first who applied for a contract to have their streets lighted with gas; and, on 1st April, 1814, their old oil lamps were replaced by gas brackets, attached, in the old form, to the houses; and these, after a good deal of objection on the part of the parish authorities, were ultimately replaced by the present form of lamp columns.

New companies began to be formed in various parts of the country so soon as the pioneers had cleared away their earlier difficulties; and Bristol, Birmingham, Chester, Kidderminster Worcester, and various other towns began to adopt the new light.

It is a somewhat remarkable circumstance that, so early as 1812, according to a new and useful journal, now in course of publication in the United States,* a house, factory, and lighthouse, in America, were lighted with gas by a Mr. David Melville, of Newport (R.I.). The journal in question, however, does not claim the invention as originally an American one, but admits that it was introduced from England. Baltimore is said to have been lighted in 1816, Boston in 1822, and New York in 1823.

* The *American Gas-light Journal, Water Gazette, and Sewerage Advocate*. J. R. Murray & Co., bankers, 40, Wall-street, New York, proprietors.

An elaborate practical treatise on the manufacture and distribution of coal-gas, by Mr. Samuel Clegg, jun., was published in 1841; and the field thus occupied has since been retained by a second edition, and now, since his death, by a third, greatly enlarged and extensively illustrated.*

From this standard work, to which we have already been indebted for some of the reminiscences of the introduction of gas-lighting just sketched, we may extract a few other particulars on one or two points of more special public interest in the present state of gas-lighting. And first of the purification of gas, respecting which we may just note that whatever may be the merits of the respective modes of purification now adopted in the metropolis, and however much improved of late years, still the system is by no means even yet perfect, and much remains to be done ere the gas companies can fully reap the vast harvest which the lighting of private houses, from top to bottom, from bed-room to kitchen, offers to those who shall mature the system of purification, especially if combined with some definite, simple, and economical mode of gas ventilation, or removal of the products of the combustion of the gas, however pure. The very fact, however, that there are no fewer than eleven different processes of purification adopted in the gas works of the metropolis alone, would seem to imply that *the best* possible mode of purification has not yet been fully discovered, or at least unanimously recognized and adopted: and as to gas ventilation, as we once before said, we are nearly in as primitive a state as Paddy with his peat fire in his mud hut without a chimney, if not more so, inasmuch as the poor Irish bog-trotter has provided many *natural* routes of egress for his products of combustion, through holes, cracks, and other openings of his cabin; while, in our "snug" metropolitan dwellings, every crevice is still but too usually shut up, even where gas is burnt, as if its poisonous products were too good a thing to be wasted or lost.

The various processes of purification through which the metropolitan gas passes ere it reaches the public are as follows:—

"1. Cream of lime; dry hydrate of lime; oxide of iron.
2. Dry scrubbers, containing brickbats, etc., and 'gypsum material;' oxide of iron; dry hydrate of lime.
3. Dilute sulphuric acid or acid solution of sulphate of ammonia; cream of lime; dry hydrate of lime; oxide of iron.
4. A dry scrubber, containing coke; solution of muriate of manganese; dry hydrate of lime; oxide of iron.
5. Water; oxide of iron; dry hydrate of lime.
6. Solution of muriate of manganese; cream of lime.
7. Oxide of iron (Laming's); a scrubber containing coke, over which water trickles.
8. Oxide of iron (Hills's); dry hydrate of lime; a scrubber containing coke, into which a jet of steam is thrown.
9. Dry hydrate of lime; oxide of iron.
10. A scrubber containing crocks, over which water trickles; water; cream of lime.
11. Scrubber containing coke and tan; scrubber of wet coke; oxide of iron; dry hydrate of lime."

Into details as to the respective purposes and merits of these and other elements of purification we cannot here enter. The various plans of purification described in Mr. Clegg's work are intended, we presume, to present a full view of what has already been done. Yet there is at least one hopeful mode we recollect of to which no reference seems to be made. The plan referred to was one discovered and patented by a clergyman in the north of England, named, if we mistake not, the Rev. Mr. Bowditch. Clay was the basis of this peculiar mode of purification, and it was said to have been successfully tried, we think, at Wakefield. But successful or not, surely the process ought to have been referred to,—if successful, favourably; or if unsuccessful, by way of warning, and to obviate future useless trouble in its revival. We are the more inclined to make allusion to this mode of purification, that we recollect of certain unseemly observations as to it by a writer employed by the gas companies, and probably interested in other processes, whose grand objection to it seemingly was that it was discovered by a clergyman and not by a gas engineer; whereas, according to this writer apparently, every cobbler ought to stick to his last. It is to be hoped that mere oversight, and no unworthy feeling of this kind, has prevented any allusion to the Rev. Mr. Bowditch's mode of purification from appearing in the excellent treatise now before us.

There has been much discussion on the question which is the burner best suited to the different qualities of gas made in the United Kingdom, and in this discussion the *Builder* has occasionally taken part. We may here merely present a tabular review of results arrived at by Mr. Barlow. These results are not very new, but they are still of sufficient interest as a point in the progress of gas-lighting: they relate to the effect of different burners on the same quality of gas obtained from Newcastle coal:—

BURNERS.	Consumption per hour.	Value of 1 cubic foot in grains of sperm.	Value of 1 cubic foot in standard candles.	Value of 8,340 feet of gas in lbs. of sperm.
1. No. 3, Fish-tail or Union-jet	5·5	276	2·3	335
2. No. 5, Bat's-wing	5·0	290	2·41	352
3. Common Argand, 15 holes..	5·5	341	2·84	414
4. Platow's registered Argand	5·5	348	2·9	422
5. Bynner's Argand	5·5	380	3·16	461
6. Winfield's Argand	5·5	335	2·79	406
7. Leslie's Argand	4·1	359	3·07	448
8. Guise's Shadowless Argand	5·5	364	3·03	442

"Though these experiments," Mr. Barlow observes, "indicate the relative adaptation of the several burners for the combustion of Newcastle coal-gas, they must not be taken as settling the question of the practical value of each. Some of them cast shadows which detract considerably from the light they yield *when placed above the level of the eye:* this is particularly the case with No. 5, which otherwise gives the best results. Others, like No. 7, require a more perfect uniformity of pressure, and an absence of all currents of air. Taking all things into consideration, No. 8 is perhaps the one to which these objections least apply, and it gives the next largest amount of light for the gas consumed, though the slight advance upon the old Argand, as constructed twenty-five years ago, cannot fail to be remarked."

One of the most recent and important improvements in gas-lighting is that of lighting exclusively from the ceiling, a mode now very generally adopted in churches, public halls, &c.; and yet this is no novelty, of recent introduction, as we lately proved by special reference to the columns of the *Builder* some ten or twelve years back, where a correspondent, "J. E. D.," described the plan as resultant from an idea of his own, and carried out into practice by him, some years previously, in a provincial theatre. The form which the "sun-light," as it is called, has now assumed, however, is certainly improved, although the invention is not a new one. It was introduced at Liverpool by a Mr. King as his own invention, and it may be interesting to some of our readers to quote what is said of it in Mr. Clegg's treatise:

"The sun-burner, introduced by Mr. King, and first applied by him to light the public buildings of Liverpool, produces the most brilliant effects of gas illumination. It consists of a combination of six or more fish-tail burners, fixed horizontally in a circle to form a star, and several of these stars are then combined together in a splendid constellation. This burner, as usually constructed, is fixed near the ceiling, and two concentric chimneys carry off the products of combustion to the external air. In the construction of the chimneys there is a remarkable peculiarity, for the purpose of making the flames of the jets of gas horizontal, so that they may throw the light directly down instead of turning upwards, as they would do if the draught of air passed between the jets into an ordinary chimney. The lower part of the inner chimney is conical or trumpet-shaped, and covers all the burners. It rises about three feet within the chimney that encloses it, the bottom of which is also conical. The products of combustion are not allowed to escape unobstructed through the inner chimney; for, near the top, there is a throttle-valve, which is so adjusted as to pass only one-fourth of the gases and vapour, the remaining three-fourths being reflected upon the back part of the flames; and, flowing over the lower edge of the inner chimney, are carried off through the outer one into the air. This regurgitation of the heated air and vapour forms a horizontal ring of flame round each jet, and the combination of these in a sun-burner of seven stars, seen from below, produces a beautiful effect.

Fig. 116 shows the section of a sun-burner with the addition of some improvements very recently patented by Mr. Strode. The horizontal fish-tail burners are inserted in a ring. The inner chimney is choked by a throttle-valve. The arrows show the direction of the air as it rushes to the burners, and the return of a large portion of it from under the bottom of the inner chimney into the outer one through the metal network.

In the sun-burner, as thus described, some inconvenience is experienced, especially when the burner is placed lower than the ceiling, by the shadow of the chimney, which throws the upper part of the room into gloom, and by the entrance of cold air when the gas is not lighted. To remedy the first inconvenience, Mr. Strode has made openings in the lower parts of the chimney, which are filled in with talc, and the access of cold air is prevented by an ingenious application of a regulating gas-holder to work a butterfly-valve. By this means, as soon as the gas is turned on, it rushes up the tube, and raises the cover of the gas-holder, which is sealed by mercury, and in rising it opens the valve. On shutting off the gas the contrary effect is produced, for then the valve is closed and the air is excluded."

One of the most important points connected with the sun-burner is that it affords in itself a system of ventilation for the products of the gas combustion.

To such ventilation, however, the simplest and cheapest lights might surely be effectively applied. A gas-light without a chimney or ventilating apparatus ought to be as unusual as a fire without a flue. Stoves without chimneys —"self-consuming stoves," as they have been cunningly, but absurdly, called—are certainly to be heard of; but so are the poisonous effects of such stoves, when these effects happen, as they not unfrequently do, to be consummated in death and coroners' inquests. We regret to observe that in the treatise now before us the important subject of gas-ventilation is discussed in a single paragraph. It ought to have been much more prominently treated of. Again, some inventions, it seems to us, are scarcely treated of as they should be; and there are other points in the book to which objection might be taken. Nevertheless, it is a very valuable work, and must be studied by all who would thoroughly understand the subject whereof it treats or are connected in any way with its manufacture.

* "A Practical Treatise on the Manufacture and Distribution of Coal-Gas; its introduction and progressive improvement; illustrated by engravings from working drawings; with general estimates. By Samuel Clegg, jun., M. Inst. C.E., F.G.S. Third edition." Weale, 59, High Holborn, London. 1859.

THE METROPOLITAN MAIN-DRAINAGE.

THE OUTFALL SEWER; SOUTH OF THE THAMES: AND THE MIDDLE-LEVEL SEWERAGE; NORTH SIDE.

After repeated delays resulting from the strike, further portions of the work of the London Main-Drainage are about to be undertaken; and in our advertisement columns of last week, appeared the announcement of a call for tenders for the Outfall Sewer—southern side of the Thames. Besides the drawings and specification for this sewer, there are also ready, and have been approved of by the Metropolitan Board, the drawings and specification for the Middle-Level Sewer, on the north side of the Thames. We are, therefore, able to supply detailed particulars of each of these portions of the design of the Metropolitan Main-Drainage. The account in our first number of the present year, may be referred to for comprehension of the general scheme of outfalls and sewers for both sides of the Thames,* though some alterations have been made; and the account subsequently, of the works to be undertaken, and which are now in progress, of the Southern High-Level Sewer, should also be looked at for the understanding of the relationship in position and levels of that which is called the Outfall Sewer, South Side, to the high level and low-level sewers.† A portion of the outfall sewer, north side, for both the high-level and the middle-level, or so far as to the westward of the Lea is concerned, being included in the contract for the high-level sewerage, has been already described.‡

THE OUTFALL SEWER: SOUTH SIDE.

Although the system has been explained in our pages, it seems desirable to preface the present account, by a reference to the circumstance that the outfalls differ in important particulars—the south side from the north side. In the former case, the outfall sewer, that is to say the line from Deptford to the outfall below Woolwich, will be a single channel carried wholly below ground—so that pumping will be required both at the outfall at the Thames, and at Deptford to pump the low-level sewage to what is called the "high level," instead of only under such as the last-named conditions of place and purpose, as in the case of the northern sewerage, where the outfall line will be above the level of the present ground, actually in three channels, and in an embankment. The temporary outfall, and future storm-water outfall, at Deptford-creek, by Church-street, will be tide-locked during a considerable portion of the twenty-four hours; whilst the high-level sewer, up to the time of completion of the outfall line and the reservoir and pumping-machinery thereat, will be subject to the inconvenience of being at times charged with a large volume of the rainfall coming from those localities which it is designed to serve. Hence the peculiar urgency of the measures which have, in fact, for their object, to relieve the low-lying locality of Deptford from the concentration thereat of the sewage and rainfall of the whole of the populous, and the upland districts forming the south of London and suburbs. The work immediately to be tendered for commences at Norman's-road, otherwise North-Pole-lane, Deptford, thus leaving a gap of about a quarter of a mile in the course between this point and that ultimately of the connection with the works now in hand. We shall refer to the portion of the work required to complete the line in a future number, when we can also give particulars of the pumping machinery for the low-level sewage, which will be in connection with the portion of the outfall sewer referred to, as well as of the machinery which will be necessary at the outfall of the Thames, south side,

* See page 3, *ante*.
† See pp. 371, 390.
‡ See volume for 1858, page 789; and page 611, *ante*.

and at the spot near the Lea, where the low-level sewage, north side, will be raised, so far as this machinery may have been decided upon. We shall also take an early opportunity of looking at the works of the high-level sewer, now in progress at Deptford and elsewhere.

The Southern Outfall Sewer, as at present specified, or from North Pole-lane to the point in Erith Marshes, opposite Dagenham Breach, will be in length 7 miles 2,240 feet, and of 11 feet 6 inches internal diameter. It will be laid to a uniform inclination of 1 in 2,640, or 2 feet per mile; and will be constructed partly in open cutting and partly in tunnel, and will be of brickwork in Portland cement,—the length of 34,200 feet being 2 bricks thick, and the length remaining of 5,000 feet in tunnel, being 2½ bricks thick, or more in particular places. Tracing the course upwards from the outfall below Crossness Point, the line begins at present 150 feet from the water's edge, and passes south-westerly across the Erith and Plumstead Marshes, and the south-eastern corner of the arsenal-ground, to the Plumstead-road. Close by where the latter crosses the North Kent line, there is a branch line from the arsenal. This the line of the sewer passes under, and then continues westerly along the Plumstead-road to Burrage-road, opposite which the portion to be executed in tunnel commences; and that continues under the town of Woolwich (directly under Beresford-square) to Albion-road, receiving various sewers in the course. Thence the ground is to be excavated; and the line continues past the Dock-yard, along Albion-road, and afterwards south-westerly along the Greenwich and Woolwich Lower-road, past the Workhouse and the Hospital, in the same line of road, and along Nelson-street, whence the line turns nearly at right angles past St. Alphege's Church, and then passes along London-street, and afterwards again in the south-westerly direction past the Greenwich Railway Station, and along the Greenwich-road to the point in that road opposite North Pole-lane first mentioned. The invert at the end next the Thames will be about 28 feet 6 inches below Trinity high-water mark, or about 20 feet below the average surface of the ground where the sewer ends—the latter surface being of course lower than the high-water level.

The boring in the Erith Marshes was carried to a depth of nearly 60 feet, or very considerably below the future level of the sewer,—and a similar depth was gone to in most of the borings, of which thirteen in all are shown in the drawings as having been taken. The result would seem to be more satisfactory than has sometimes been predicted. Water was met with at 8 to 20 feet from the surface; but at the Erith and Plumstead marshes, the invert of the sewer would be laid in the upper part of a bed of "grey subangular flint-gravel," which seems to reach to 25 feet thick and upwards, though some portion of the sewer itself is in peat. At Cross Manor Way, in the Erith marshes, the strata, after the surface soil, are 5 feet of light brown clay; 2 feet, brown silty clay, with vegetable matter; 5 feet 6 inches, peat; 1 foot 6 inches, dark grey silty clay; 1 foot, peat; 1 foot 6 inches, dark grey silty clay; 27 feet 6 inches of the grey flint-gravel before-named; 1 foot 6 inches, grey sand; 2 feet, dark grey sand; 1 foot black sand, and 3 feet grey sand. In some part of its course, as in the eastern parts of Woolwich, the sewer would pass through chalk and flints. The strata are marked as sand, chiefly, of various kinds, and gravel, throughout the course. All these appear to be charged with water, which near Deptford Creek rose to within 3 feet of the surface after the boring had been carried down about 9 feet, or to the bottom of the peat. The open cutting required may vary from 15 feet in depth to 40 feet; the invert in the tunnel, being 70 or 80 feet in the deepest part below the street level in Woolwich. At the tunnel, all vacant spaces round the sewer, hard up to the timbering, chalk, or maiden earth, are to be filled in solid with bricks bedded in Portland cement. Shafts are to be sunk for the construction of the tunnel; and six of these, 11 feet 6 inches in the clear, are to be left finished in brickwork, and to be covered over with iron plates, and finished with ventilating grates, two to each shaft. There will be thirty-seven other ventilating shafts to the sewer, inclusive of those over side entrances, but exclusive of seven over bell-mouth junctions. These shafts will be 3 feet in diameter, and of 9-inch brickwork, and will have each two cast-iron gratings. There will be twenty-two side entrances and sixty gullies—the latter to be each 3 feet by 3 feet, and 6 feet in depth.

In one part of the sewer's course along the Greenwich and Woolwich and Lower Road, the road crosses a tramway which leads from the Charlton Chalk-pit. Some contrivance, therefore, was necessary to get the sewer across, but beneath the rails. In effecting this, the road will be raised only 8½ inches higher than at present at the crossing, and the rails 15 inches above their present level; this is managed by forming 6 feet 5½ inches of the crown of the sewer, of two cast-iron ribs or plates, each 4 feet 3½ inches in width,—each plate with, along the middle of it, a strengthening web and top flange. The lower flange or plate carries the rails, and is the crown of the sewer: the top flange and web to each plate curve above the level of the rails. The sewer will also pass under some other branches of the line of railway. The general directions for execution of the work, and the conditions of the contract, with the schedule of prices, are nearly the same as those we have quoted from in former cases. Weekly accounts of extras and omissions, duly ordered in writing, are to be given by the contractor. The works are to be finished within two years from the date of the engineer's order to commence, or 50*l.* as liquidated damages for each day over that time are to be paid." But in the event of delay to the works, by reason of strikes or combinations on the part of the workmen employed, the engineer will allow such additional time as he may deem fair and reasonable." In the schedule of prices, the items are the same as we have before given, with one or two additions. The earthwork in tunnelling, with the carting, are set down at 5s. 6d. per yard cubic. The day labour for bricklayers, carpenters, masons, and smiths, is to be 6s. per day of ten hours; that for the excavators, 4s.; and that for labourers, 3s. 6d. The specification and form of contract fills twenty-nine pages, and refers to nine drawings as numbered — including the sections of borings and trial shafts; but these drawings extend over thirty-five large sheets.

THE MIDDLE LEVEL SEWERAGE, NORTH SIDE.

The works designed for the middle-level sewerage, north side of the Thames, comprise a main line 9 miles 2,650 feet in length, and three branches, the whole amounting to 12 miles 1,280 feet, of which 33,862 feet will be executed in tunnelling, chiefly through London clay. The works commence eastward of the Lea and of the North London Railway, from the penstock and overflow chambers described in our notices of the high-level sewerage and works; and the line passes along Old Ford-lane, the Bethnal Green-road, Old-street, Wilderness-row, Liquorpond-street, Theobald's-road, Hart-street, Oxford-street, the Bayswater-road, Pembridge-gardens, and up to the western arm of the Counter's-creek sewer where the Great Western Railway crosses it at Kensall-green. There is a branch for Coppice-row and the Bagnige Wells-road; one passing along Bedford-row and Piccadilly, called the Piccadilly branch; and one for Dover-street.

From the junction with the high-level sewerage the main line, traced up the stream, first extends south-westerly to Old Ford-road, and then along this road to near the skew-bridge over Sir George Duckett's canal, and south-westerly again along Warwick or Chisenhale road, to within a few feet of the Regent's-canal; the whole length of this portion of the works being 4,430 feet, in which distance the sewer will be laid to an inclination of 1 in 2,640, or 2 feet per mile, and will be in cross-section a stilted semicircular arch of 6 feet radius, with a wide invert as the channel. The dimensions in the clear are 12 feet in width, and 9 feet 6 inches in height; and the invert and the semicircular arch are each of 2 bricks thick, the latter rising from dwarf walls of 3 bricks, carried up from a level foundation. Except the semicircular arch, which will be in mortar, the whole of the work here will be executed in Portland cement weighing not less than 108lbs. to the striked bushel, mixed with an equal proportion of sand, except where the cement would be liable to be acted upon by water before having had time to resist it, in which event neat cement is to be used. The invert will be here above the London clay, and the sewer will pass chiefly through sand and gravel, which, in some cases, was found on boring to be copiously charged with water; and the excavation for the sewer may average 20 feet in depth. Under the Regent's-canal a length of 160 feet will require special construction, to be further described. The line thence extends with the same inclination, for a length of 2,760 feet, as a barrel sewer 10 feet 6 inches internal diameter, and 2 bricks thick, the upper half in mortar, and the rest in cement, still above the London clay, along Green-street, in the course of which street the Limekiln Dock sewer is connected with it. Towards the end of Green-street, the sewer will be for 420 feet in length, 10 feet 3 inches in diameter, and 2 bricks thick as before. This length ends at the Cambridge-road, where there is to be a connection with the Ratcliffe-highway sewer. Here the sewer has passed into the London clay, which is met with at 11 or 12 feet from the present surface; in which clay where it occurred on plan, all the borings for the middle-level sewerage ended. Thence the line passes along the Bethnal Green-road and Church-street to High-street, Shoreditch, a length of 5,130 feet, the internal diameter being 10 feet. Here the London clay does not rise to more than half the height of the sewer. From High-street the sewer will pass through private buildings and property to New Inn-yard, along which it will extend to Curtain-road; and thence pass in a north-westerly direction along Susannah-row and Willow-walk to Tabernacle-square. This portion, a length of 1,740 feet, is 9 feet 9 inches in diameter. At Tabernacle-square, the London-bridge sewer will be connected. Next there is a length of 930 feet, 9 feet 3 inches in diameter, passing along City-terrace and through private premises to Old Street-road, along which road the line passes to the City-road. Thence for 2,620 feet, with 9 feet internal diameter, the sewer will extend along Old-street to Goswell-street; thence for 1,731 feet, with 8 feet 9 inches, across the angle of the Charter House grounds, along Wilderness-row, across St. John's-street, through private property, across St. John's-square, and to near Red Lion-street, Clerkenwell. From this point a special method of construction is devised for passing the Fleet Valley, whereat the soil is made-ground for a considerable thickness overlying the London clay. The borings generally for the purposes of the main drainage, we may observe, present a body of information which will be of great value, effecting a saving of expense, or preventing loss in future building operations. It may be noted, by way of illustration, that the made-ground in Goswell-street is shown to extend to a depth of nearly 20 feet from the present level of surface; and nearly the same thing occurs at the Regent-circus. In St. John's-square, there is made-ground for about 22 feet, on the London clay; and that ground, at the base, is copiously charged with water. At Red Lion-street, however, there is only 7 feet of made-ground, the London clay rising higher — with about 7 feet of fine sand, gravel and sand, and yellow clay, interposed. Thence following the line of the sewer past the south angle of the Sessions House, and across the vacant ground and Victoria-street, the top surface of the ground, as well as the London clay, descends rapidly, until the level of the invert of the sewer would coincide with that of the floor of the existing vaults, with a depth of about 12 feet of made-ground below that level.

The sewer, east and west of Victoria-street, for a certain distance, will be lined with cast-iron plates; and in the same portion of the sewer there will be contrivances for an overflow into the Fleet Sewer, as well as for the junction of the Coppice-row branch. The entire length, 559 feet, where the special construction occurs, will be divided thus. The length, 223 feet, eastward of Victoria-street, which will be of 8 feet 11 inches internal diameter, of two bricks thick in cement, will be lined with plates, 1 inch in general thickness, with flanges, the joints made water-tight with iron cement, and all the plates being bolted and screwed together, and built in the brickwork, giving 8 feet 9 inches as the diameter when finished. Westward of, and under Victoria-street, for 300 feet, the sewer is constructed in similar manner, but so as to finish 7 feet in the clear. The distance left between the 223 feet and the 300 feet, or 36 feet, includes the contrivances for overflow into the Fleet Sewer, and the connection of the Coppice-row branch. There is an overflow chamber, 8 feet 9 inches in width, and chiefly 10 feet 9 inches in height, the top lined with iron plates, which are to be bolted to the brickwork with bolts 8 feet in length. A weir, of cast iron, is to be formed on one side the chamber, tapering from 17 feet in width and 2 feet in height, to a 4-feet iron pipe of 6-feet lengths, with sockets, made watertight with tarred yarn and lead; and the pipe is to be joined into the Fleet Sewer. The Coppice-row sewerage will be connected with a portion of the brick and iron-lined chamber by 4-feet iron piping, of a similar kind. Where the chamber and a portion of the sewer is above the level of the ground, the work will be built into solid brickwork, and will be covered with 6-inch landings. The whole of this brickwork will be in cement.

The 300 feet ends at Little Saffron-hill, and here, also, terminates the portion of the sewer, east, which is to be constructed in open cutting.

Westward of Little Saffron-hill, by the line of streets to the Bayswater-road, and along that road and Pembridge gardens and Crescent, to Denbigh-road, the work will be executed in tunnelling. From Little Saffron-hill, first, a length of 1,200 feet of 7 feet sewer, of 1½ brick in cement, will pass partly through private property to Back-hill, and along Liquorpond-street. Hence or from Gray's-Inn-lane, along King's-road to Bedford-row, a length of 780 feet will have a diameter of 6 feet 9 inches, and the same kind of brickwork: from Bedford-row, where the Piccadilly branch commences, a length of 2,830 feet of sewer, 6 feet 6 inches, will pass along Theobald's-road, Vernon-place, Bloomsbury-square, Hart-street, and New Oxford-street to Bloomsbury-street; and thence along Oxford-street to Wells-street, 2,270 feet of 6 feet 3 inches; and thence to Regent-street 1,192 feet of 6 feet diameter. From the Fleet sewer to Regent-street, the inclination will be 1 in 1,637, or 3·23 feet per mile.

At Regent-street there will be formed, in open cutting, an overflow chamber 18 feet in length, with a weir, by the Regent-street sewer. Further the tunnelling will be continued along Oxford-street for 1,800 feet, of 5 feet 9 inches diameter, to the King's Scholar's Pond sewer by Davies-street; thence the sewer, for 6,120 feet, along the Bayswater-road to the Ranelagh sewer at the Grand Junction-road, will be of 5 feet 6 inches diameter,—as before, of 1½ brick thick in cement. Opposite Great Cumberland-street, the invert of the sewer will be about 55 feet from the surface of the street. Continued to Pembridge-gardens, 4,690 feet, the sewer will be egg-shaped, 6 feet high by 4 feet wide, and 1½ brick thick in cement; and turned northward along Pembridge-gardens to Denbigh-terrace, 2,050 feet, it will be 5 feet 3 inches by 3 feet 6 inches. The construction in open cutting is then resumed, and will comprise 1,550 feet along Denbigh-road, through building ground and private property to Cornwall-road, 5 feet 3 inches by 3 feet 6 inches, and 1½ brick thick; and 5,170 feet from Cornwall-road, north-westerly, through fields and private property, to the western arm of the Counters Creek sewer at the railway, as before mentioned, which length will be 4 feet 6 inches by 3 feet, and 1 brick thick. The inclination from Regent-street to the Cornwall-road will be 1 in 1,338, or 3·95 feet per mile, and that beyond the road will be 1 in 300, or 17·60 feet per mile.

In the 160 feet of special construction under the Regent's-canal, the sewer will be covered by girders, 5 feet from centre to centre, and half-brick arches. The bottom flanges of the girders will carry cast-iron plates as the ceiling to the sewer; and the spaces left will be filled with cement concrete, which also is to be laid above the brickwork, to form the bed of the canal. The junctions and beddings of the iron-work are to be run with iron cement. The contrivances in all portions of the sewerage which have been described by us, for passing a sewer under a canal or railway, display much ingenuity. Weirs and overflow contrivances are provided where several of the old sewers intersect, as in the case of the London-bridge sewer at Tabernacle-square, where a chamber 20 feet in length is formed, in order to get a considerable width of opening for escape. The sills of weirs will be formed of Aberdeen granite, with dowels into the brickwork at meeting ends of the stones of the sill where required. The general mode of connection in the case of these weirs and overflows to the old sewers, is by iron pipes; the contrivance being such that the new sewer will intercept the sewerage from the old sewers under ordinary circumstances; whilst in cases of excessive rainfall the old outlets to the river will come into use.

We have yet to describe the intended course of the Piccadilly Branch, and other portions of the works specified for the Middle Level Sewerage, north side of the Thames.

AMATEUR CRITICISM ON ART: ITS RIGHTS AND LIMITS.*

No man of experience who has taken the trouble to investigate at all the present state of the art architectural in this country, as compared with its position in the days of his early remembrance, can fail to recognize the fact, that we are now witnessing, with respect to it, the recurrence of one of those great revolutions of public taste and private feeling which seem to mark the history of almost every pursuit, whether moral, intellectual, or imaginative, whereby the human mind has sought for solace, instruction, or recreation, in its present estate.

From being, as of yore, neglected by the great majority of men of taste, who did not actually depend upon its practice as a means of subsistence, and from being excluded from the consideration of polite society as too doubtful and inelegant an art to find favour in its polished circles; not only is it now deemed a worthy study by every one pretending to the possession of a liberally informed mind, but entire ignorance of its leading principles and chief classifications is looked upon almost as a reproach; and, not staying its career at the threshold of the rich man's house, or finding a final resting-place amid the neglected shelves of the pedant's library, we meet with its introductory hand-books and illustrated volumes occupying honoured places on every drawing-room table, and often constituting the most prized and eagerly perused treasures of the lady's boudoir.

Various speculations might be hazarded, no doubt, as to the causes which have combined to bring about the revival of this beautiful and much neglected branch of the fine arts; but I think that one of the principal motive powers has been that, in the course of architectural and archæological researches, the minds not only of professors but also of amateurs and connoisseurs have been aroused, by the very fact of its almost utter extinction among us, to a sense of its worth and dignity; and, by one of those revolutions which often occur in the course of human events, the day of the greatest degradation of architecture in England seems likely to be succeeded by a culmination, though limited in degree yet as unmistakeable in fact, as any which has marked the ever-revolving cycles in the progress of the fine arts during the history of the world.

I do not think that a great revolution in art has ever been brought about except by the concurrence and combined influences of both professor and amateur. As with the poet, so with the architect, the sculptor, the painter, and the musician; all are as it were the offspring of their own particular time and country. The man of genius may, doubtless, in the first instance, lead the public mind in a particular direction, and suggest to it certain pursuits or elements of thought, which the existing state of social taste and circumstances may cause to take deep root; and he may thus be the means of giving definite aim and form to some innate feeling,—a feeling probably brought into existence by a vague sense of an intellectual want, and which his sagacity leads onward, and renders predominant and practical. But other minds must necessarily already sympathise with his own, for otherwise no genius, however great, could exercise any influence on them. And in this manner it is, I submit, that the professor and layman must ever co-operate, and mutually as it were act upon each other, before a fine art can gain an ascendency, and exercise its legitimate influence on the tastes of a people.

Are not the effects of these combined influences strikingly illustrated, in the place which architecture as a fine art now occupies in the public mind? And if we refer to history, do not the annals of ancient and modern art attest the same story, of genius patronized by the wealth and influence of crowned or mitred heads; and, secondly, by the support and approval of public taste and intellect? If, in glancing back at the early efforts of our own ecclesiastical architects, the mind is staggered in the contemplation of the magnitude and beauty of structures, whose origin is to be traced to times so gloomy and troubled, that historians can bestow upon them no more fitting epithet than "the Dark Ages," still may we find some explanation of this seeming anomaly, if we may be allowed to conjecture that the quenchless spark of genius, bowed down by surrounding evil, yet found for itself this medium for the expression of its emotions, and in these great monuments asserted the brightness of its flame, in far-off days, with a power that shall be acknowledged to the latest generations.

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It is, I apprehend, quite unnecessary to enter upon any argument in proof of the fact that the great body of intelligent amateurs must ever exercise a powerful influence upon the progress and success of the arts; for a discriminating patronage, bestowed by those who have it in their power, is absolutely necessary to ensure its existence and advancement among a people. How far, then, may a connoisseur of refined and educated taste indulge in the office of independent criticism on art? To what extent should his influence and opinion be acknowledged, as compared with those of the professional man? I, of course, assume that all men of taste agree in acknowledging the existence of certain principles of beauty, and therefore their diversities of opinion and feeling may be expected to exhibit themselves only in their choice and preference of some one or more of their various phases and combinations.

In all questions of importance to the welfare of mankind in general, it is incumbent upon us as members of the great human family and of society, to form an independent opinion for our own guidance, according to the judgment and ability with which we may have been endowed, and not from mere negligence and love of ease to permit ourselves to be carried away at the will and dictation of others, to avoid the trouble or responsibility of arriving at a just and candid conclusion. I cannot see that the study of the fine arts ought to form any exception to this universal rule of conduct.

It would seem to be almost an infirmity peculiar to our own times, that certain classes of the professors of art, should array themselves against one another in parties as advocates of extreme and widely differing views and doctrines, an adhesion to which they even sometimes propound as forming the very essence of their art. How, then, shall the civilian decide between these contending parties? His most simple and obvious course, under many circumstances, would probably be that too often taken, of giving in his allegiance to one side or the other, and adopting all its opinions without due thought or consideration.

There can, I think, be no doubt that this system of leaning upon others in matters of art, instead of exercising a rational judgment founded on principle, is one of the greatest obstacles to the growth and development of sound taste; for let a man once adopt his school and his leaders, and he soon learns to mould his own previously imperfectly-formed opinions to those of his party, (and of course it is much easier to have a thing done for you than to do it yourself). But in the meantime, for want of a little energy and moral courage, in maintaining the genuine predilections and feelings with which the man's nature has been originally endowed, they will gradually weaken and droop, till he finds himself to an extent which as an independent agent he could scarcely suppose possible—the mere tool in the hands of more energetic men than himself; and, like a child in leading-strings, he surrenders himself to the guidance of any who will take the trouble to lead or mislead him, as the case may be.

There is, I think, a very marked and obvious distinction between the position in which the non-professional man stands with respect to an exact science, and that occupied by a connoisseur in the fine arts. The former sciences, based as they are upon certain fixed rules, and developed by innumerable steps of discovery and invention, are matters of certain and progressive knowledge, and any one who pursues them as a study, to have any prospect of success, must acquaint himself with all their latest discoveries and improvements in principle and detail; and possessing a knowledge of these, the chemist, the engineer, or the mathematician, may be tolerably confident of their ground, and even prove to demonstration that the conclusion each may have arrived at is the only admissible one under the circumstances. The artist, on the other hand, may, so far as the technicalities of his art are concerned, speak with authority, and prove to demonstration his correctness in such matters as accuracy of drawing, exactness in delineation of an order of architecture, and other details, to which precise rule is applicable; but here the parallel between him and the man of mere science ceases, and the moment we come to the discussion of matters of imagination, invention, and feeling, the professional artist and the amateur occupy common ground; and thus on the very essentials of fine art, actual right or wrong are incapable of arbitrary definition, and the amateur of a cultivated and refined mind becomes as competent a critic upon questions of high art as the professor; and this distinction must always exist; for what would be thought of the engineer, or philosopher, who began to construct a steam-engine on the model of fifty years ago, or who betrayed ignorance of the doctrine of gravitation, instead of taking up their respective sciences at the point at which they have now progressively arrived. But, except as to technicalities and the general principles of art, as derived from former schools, the artist is entirely dependent on his own individual genius to give life and character to his work; and before any just analogy can be admitted to exist between him and the professor of an exact science, he must be prepared to say that he can (the elements and principles of his art once mastered) take it up where it was left by a Phidias, a Michelangelo, or a Turner. * *

* From a paper, as already mentioned, read before the Liverpool Architectural Society, by Mr. Francis Horner, associate member.

I have heard it asserted by artists, that the mere connoisseur in the fine arts ought to confine himself to admiring what is beautiful, without presuming to criticise what he deems to be the faults, of works which may come under his review; that he must look upon a Rembrandt simply as a splendid example of chiaro-scuro, and there be satisfied to limit his estimate of the master, acknowledging him too great to be subject to any qualification of his perfect homage; that he is in like manner to acknowledge Turner as transcendent in painting light, and be blind to any deficiencies in his works of any of his dates or manners. So with respect to the sister arts, I presume he is to see the beauty of architectural compositions, sculpture, &c., but is to be absolutely interdicted from expressing an adverse opinion upon any of their shortcomings or deficiencies, in expression, proportion, or execution in any manner whatever. Now, I must respectfully but decidedly differ from the advocates of such a system of blind adulation as is thus propounded, for the guidance of men who have been endowed with a perception of the beautiful in nature or art, and who have cultivated this portion of their mind, in any degree, by observation and study. I repeat that I do not deny that there are certain technical characteristics in all branches of art of which the artist is necessarily a more competent judge than the amateur; but beyond these practical technicalities the latter must, unless he is to be a mere puppet in the hands of a certain clique or school, be permitted to exercise his own individual and unbiassed judgment. And miserable patrons indeed would the artists find such a community as the contrary doctrine assumes.

What can a man's estimate of character or beauty be who is not capable of detecting where character or beauty is absent? What is commendation worth from the lips of one, who knows not when or how to condemn? * * *

If the public are to follow the lead of the professors in all these matters, on whose dicta are they to rely? for, among artists themselves we shall find as diverse and opposite opinions as it is possible to entertain. In architecture a man may attach himself alike to the Gothic or Classic factions, and in either, will not fail to meet with able leaders, who zealously advocate their own views, to the disparagement of those of their opponents; and it is singular to observe the earnestness and indomitable perseverance with which this hand-to-hand fight between the disciples of the vertical and horizontal styles is kept up on both sides. If, like the seven sleepers, we go to slumber at a time when the Pagans are persecuting the Christians, and sleep ever so long, and awake at ever so remote a period, it would seem as though we should still find the fight proceeding, the only variation being, that it may then be the turn of the Christians to chastise the pagans. In circumstances like these, how absolutely necessary it is that the civilian should endeavour by study, and the exercise of original thought and feeling, to arrive at an independent conclusion as to the merits of the subject under debate.

Some of the facts connected with this very controversy, however, afford the strongest illustration of the great influence which intelligent amateurs may exert upon the object of their taste, for, I believe I am right in saying that two of the most prominent disputants engaged in the discussion are laymen. Nor would it be difficult to point out instances in which connoisseurs in other branches of art have, by sound judgment and an enlightened and liberal patronage, directed their course and advanced their interests to a very remarkable extent. If we turn to the painter's art, shall we find a greater spirit of unanimity amongst them as to the principles and practice which ought to govern them? Shall we not, on the contrary, find them broken up into contending parties? dismembered by the most extraordinary schisms? And in this instance also do we not find some of the most powerful champions of each party among the ranks of their amateur adherents?

It is satisfactory to find that in some of our more prosperous colonies, where the struggle for a bare subsistence, which first settlers generally find it their lot to encounter, has given place to circumstances of comfort and comparative affluence; the inhabitants begin to display a taste to reproduce around them the outward architectural forms, as well as the social institutions of the mother country. And one most interesting instance of the associations of home being introduced through the medium of architecture, has occurred at Sydney, in the erection of the fine Tudor design for the University there, which has just been completed by Mr. Blackell, the colonial architect, who, under the auspices of Sir Charles Nicholson and other munificent patrons, has apparently produced a building on a great scale, of a beauty of design and solidity of construction which reflects high honour on all concerned in it; and which, with its elaborate decorations, and richly-stained windows, seems well calculated to recall to the minds and hearts of the colonists, the ancient grandeur of their native land, and in no small degree contribute to attach them to her memory.

It is to be hoped that a work so well begun may be continued in the same spirit, and that not only in Sydney, but in all our colonial dependencies where our fellow-countrymen have sought distant homes, we may find the development of high civilization, which ever accompanies wealth and prosperity, adorned, also, by a reviving love of art.

It has often occurred to me that the position in which the modern architect, practising in a new country is placed, is one of great peculiarity, On the one hand he has, in all probability. emigrated from the mother country, furnished with a knowledge of almost every style of architecture that has existed in the ancient or modern worlds, the individual types of each of which we are to suppose originated in, and were developed in accordance with, the peculiar state of society, and the habits of the time and country to which they respectively belong. On the other hand, combined with this extensive knowledge, and the possession of such vast and heterogeneous materials from which to select, he finds himself placed in the midst of such novel circumstances, as would seem most favourable for the introduction of a phase of art, which, being adapted to the climatic and other coincidences which surround him, might possess more of originality and distinctive character, than are likely to arise from a system of design, strictly based upon the model of an elaborate and highly-developed exotic importation.

What the ultimate destination of colonial architecture is likely to be, is indeed a very wide speculation; but in the meantime, taking into consideration the innate feeling of attachment to his native land with which man is always more or less endowed, we must not be surprised if the colonist, when he first finds himself in a position to indulge his artistic tastes, from which he has in all probability been long debarred; naturally turning his thoughts backward to the recollections of the mother country, is, in the land of his adoption, inclined to reproduce around him (so far as circumstances will admit) the architectural forms and types which must ever be so intimately associated in his mind through her works, and which are probably held more dear by him than ever, in a country where all is new; from the fact of their speaking to him the language of the olden times, and serving, as it were, as emblems of the antiquity and stability of his race and lineage.

Architecture, from its enduring elements and national associations, seems above all other arts to exercise this very powerful influence over the human mind; and in this respect, indeed, it often occurs to me, that the emotions suggested by the contemplation of its ancient works—those works which seem as it were to embody in their stones the history of a people—are very analogous to those excited by external nature herself.

THE EXHIBITION OF DESIGNS FOR A NEW GUILDHALL, CAMBRIDGE.

THE designs for the new Guildhall, and other public buildings for the borough of Cambridge, which have just been exhibited in accordance with an announcement made in our pages, comprise twenty sets of drawings. The number is small in comparison with that of designs in competitions of similar importance, to which we have had recently to give attention. The amount first to be expended, however, was not to exceed 6,000*l*. Perhaps architects are beginning to find that results to those who are not chosen, do not compensate for labour, great and repeated, and such as must remain profitless, at least so long as the authors' names are not appended to designs. The motto system, even in the point of view of the objects of the promoters of a competition, has been shown to be not merely useless, but prejudicial; and in the present case, the stipulation that the motto should not be in the author's handwriting, has been equally as usual, inefficacious for concealment. Some of the best designs are at once to be referred to certain authors, from treatment and character, and the manner of drawing; and in others, the same mottoes, and, we think the same handwriting, are used, as were appended to designs obviously of the same authorship, which were reported upon by us at Westminster, Manchester, or elsewhere. The identification is assisted by the description of mounting, and that in spite of the careful prohibition by the committee at Cambridge of "ornamental margins." The system, simply, gives prominence to some competitors; and does not give to others that which may be their due by merit. It is retained because committees, not aware of the objection to it, are under the idea that it is consistent with fairness, and is acceptable to architects. We trust, however, if competitions are to be continued, we may shortly be able to speak of the use of mottoes as merely optional. It may be said, the effect would be to direct attention to designs by architects having a reputation. But, with professional assistance in selection, we do not think that would be the objection; whilst without such assistance, we are prepared to show, not merely the objects of committees, but probably those of the profession generally, and of each architect, would be better served, had the name and experience of an individual just so much weight as a committee are compelled to place in the balance when they come to actual building,—so much as will constitute a design something more than a picture—a mere unacted drama—a *vox et præterea nihil*. The whole, however, adds to the argument otherwise, in favour of the professional assistance.

With these several views arising out of the nature of architectural *designs*, the course taken by the Cambridge Committee in seeking advice of the Institute of British Architects, met with our warm approval; and we shall be not sorry should such applications force upon the Institute a more active interest in the competition system,—in order that they may regulate or oppose it, one or the other—seeing that it is now greatly influential; and peradventure is baneful to art. For, it is obvious that the offer, as in this instance of premiums of 200*l*. and 100*l*., must call into play a considerable proportion of mere drawing-practice, which, whether valuable as such, or made the indication of some kind of talent, would not be what the object demanded. In the present case we believe we see results of this sort of competing in designs which are made with an eye to a premium rather than to the object of the committee, and its accomplishment, and to a return as coming therefrom.

The problem given was one of unusual difficulty, and demanding much professional experience. The ground is of very irregular form. The streets at Cambridge, called Butcher-row, east; Wheeler-street, south; and Peas-hill west, are narrow or unsuited for a public building: a street or way, called Butter-row, at present separates the front or northern portion of the ground, on which the Shire-hall stands, from the main portion in which the assembly-room would have to be placed; buildings, not the property of the Corporation, cut into the ground at the north-west angle; and portions of the property are let on lease for various terms, and are in such positions that they interfere much with freedom of design and planning, and perhaps with the prospects of success as regards the objects of the building. Most of the competitors, however, have followed the irregular boundaries,—as though it were necessary in planning, to entirely cover ground.

In decorative character there is unusual similarity in the designs. The majority of those sent are Gothic, and Gothic which is distinctively Italian or Continental in appearance. There is not one design of this number which is either English, or which, as it appears to us, is at all in harmony with the associations of Cambridge. In several cases, the Gothic, whilst very different from that of the modernly built colleges, is quite as much caricature of a style. The preponderance of Gothic designs, no doubt, is due—besides the idea which many would have that such designs alone would be acceptable—to an idea that the Gothic could be made best to meet difficulties of the site. Those plans, however, which are best devised both for the temporary circumstances, and those of the possession of the remainder of the site, we think, are not those which are Gothic. We speak not confidently on the matter, because, as usual, there is great difficulty arising from manner of delineation and inattention to instructions, in comparing one plan with another,—the difficulty of catching the intentions of the architect in the time which we could devote to one subject, being greater from our having been deprived of the written particulars, which had been brought to London for purposes of reference in the adjudication.

The professional assistance acquired by the committee, is that of Professor Donaldson; and, having had reason to apprehend in some cases

that a similar duty by architects has been got through too hastily, we are glad to learn that he has so far, given the time to the examination which such difficult and arduous duty requires. By next week we shall, perhaps, have the result. We cannot but think that some observations upon the taste displayed in most of the designs, which is far below what produced such art as Cambridge contains, whether in King's College Chapel, or works that are of very different style, would not be ill-timed from the London Professor of Architecture. The conditions were stringent against colour in tinting and writing on the drawings. Though this sort of stipulation may interfere with exhibition of an architect's intentions, it has on the whole a good tendency at this time, when that which has been called the "streaky-bacon style," is so much in the ascendant.

For the 6,000*l.* proposed to be expended first, there were to be provided the public Assembly-room, to hold 1,400 persons, a free library and reading-room, town clerk's offices, committee-rooms, and a school of art,—the rooms of the school to be lighted from the north or east—the former preferred. Portions of the Shire-hall, or northerly building which fronts the Market-place, and which is of very plain Italian character, as well as the eastern and western ground generally, are those portions which are not available. Part of the ground south of Butter-row is occupied by the present hall or Assembly-room, and certain offices—these being joined to the Shire-hall by a way bridged over the narrow row. The buildings for future erection, and not included in the 6,000*l.*, comprise a corn exchange, a post-office, inland revenue offices, a council chamber, a magistrates' court, and some minor rooms and offices. The longest lease in the case of ground for these buildings, expires in 1876, when power also might be obtained to stop up and build upon Butter-row. The main access to the Assembly-room in many of the designs is seriously affected by these disadvantages, and that equally whether it be supposed to be from Butter-row, that is at least temporarily, or by passing through the Shire-hall by passage or staircase. Other designs get sufficient width of entrance into the building, from the opposite end, or Wheeler-street; but this would call for improvement in Wheeler-street, and the streets leading to it. The south-west angle of the ground was suggested as the site for the Corn-Exchange—Peas-hill and Wheeler-street there joining in a larger area than ordinary, of street-space.

The drawings are exhibited, and on the whole with more success than usual in these cases, in the present Assembly-room, and have been visited by large numbers of persons, particularly in the evenings. The first design to the left on entering the rooms, marked "Similis non vidisti," is a Gothic design, having the principal street entrance for the Assembly-room or hall, from Butter-row; this placed north and south, being on the ground-floor, and so designed as to serve several purposes. There are no side galleries to the hall. The decorative character of the interior, which approaches nearer to the English Gothic than in most cases, seems as though by a different hand. The collar is carried by timber principal arches rising from hammer-beams, and by struts which are ceiled to—giving a common form of ceiling, the hexagonal. An organ gallery is placed at one end, and there is a dais with seats and desks, and bay-windows at the other.—The design marked "Floreat Cantabrigia," which comes next, and is to be distinguished from several others with the same motto, as being marked thus ✠, is one of the best of the continental Gothic designs. We give on this occasion, for the reasons we have stated, more prominent attention than we generally think desirable to the designs in their exclusively decorative character. We may, however, state that the present design has the Assembly-room placed east and west, on the first floor above the street—or nearly in the position of the present room; whilst the access to it is circuitous, the staircase being in the centre of the building. The principal entrance would be at first from Butter-row, which might be covered with glass, and eventually from Butcher-row. A great proportion of the designs have the corn-exchange polygonal on plan; but the present plan adopts the rectangular form, with a gallery on one side, over an external loggia to the ground-floor—the front of this gallery to the interior presenting an arcade in light ironwork construction, which supports the half of the roof. The building for the site of the Shire-hall has a character similar to that of the town-halls of the Netherlands, with coloured materials in stripes, added; and it may be right to say in deduction from what we have hinted at as questionable in present taste, that this and some other designs may contemplate the use of stone, in which the *slight* variation of tone and colour which is obtainable is not always objectionable, but is in some cases rather pleasing; though contrast is usually intensified in drawings. There are three stories of windows, the upper story with an arcaded parapet, and twisted shafts, as pinnacles with vanes, carried from the stringcourse below; and a lower story as a loggia or arcade. A tower rises from the centre of the front, but not from lines carried to the ground; and it has a balcony at the level of the parapet, and a second balcony on its lower stage, above which the tower is octagonal, with mullioned and transomed windows, angle shafts, and gurgoyles, and a double conical capping, with banded covering and lucarnes. In the centre of the first-floor is a bay-window. The angles of the building have octagonal turrets, with spirelets or pinnacles; and the ends and gables are broken by narrow buttresses or projections carrying pinnacles, somewhat similar to the manner in Mr. Scott's design for the Foreign Office. Use of the same models in this latter design, together with the new museum at Oxford, and in many of the designs at Cambridge, indeed, is the impression given on looking at most of the Gothic designs under consideration. As in the design now under notice, parts of the buildings at the angles, square on plan, are treated as pavilions, with high saddle-backed, or truncated roof coverings: and the fondness for towers, each with double conical and slated and banded spire capping, and square pinnacles, also slated, and placed directly upon a lofty undecorated portion of wall-surface in the tower, is general; and a tower somewhat of this character is placed at the south-west angle of the design just instanced. The author has sent six well-executed perspective views. It may be well to add, that he estimates comparative cost of different descriptions of flooring for a room of 18 feet by 16 feet, thus:—

	£.	s.	d.
Timber floor; commonest	15	5	7
Ditto; superior	20	9	1
Fire-proof—with cement surface (iron joists, filled in with strips of wood, mortar, and concrete)	17	3	0
Ditto, with boarded surface	20	9	3

A design, marked "Cantab," is of Florentine Gothic, and decidedly clever, though too much enriched; and from defects of the drawing is apparently the work of one having his course yet to make. Moreover, the interior view of the Corn-Exchange, suggests that the author has been looking at the Covent-garden Floral-hall. The Assembly-room will be placed north and south, with a semicircular end appearing prominently in the south front: it would be 128 feet by 43 feet, and would have the school and library below it. In the principal front there are statues under canopies—the latter ranging with the parapet—the design generally being two stories in height.

Passing over a design marked "Esse quam videri," we come to one marked "Cito," which also is Gothic, and more English, so far as the impression which is conveyed by the interior of the hall with open hammer-beamed roof. Side galleries are carried on cantilevers. The main features of the exterior are the high truncated portions of the roof, geometrical traceried windows, with crocketed canopies or coloured *voussoirs*, a tower of the character we have spoken of, but with a truncated roof, and pinnacles elsewhere, which are carried by square buttress-like projections, some of which, however, do not rise from the ground, but are borne by slight shafts with enriched capitals. There is an alternative design by the same author, also Gothic, but not of great merit.—"Floreat Cantabrigia," by a different hand to that which produced the design already mentioned, has a plan not sufficiently studied, and a peculiar pointed-arched character which we can scarcely call good, or Gothic. The roof-coverings, also, fall into error of the day—imitation or exaggeration. The management of breaks and recesses in the design, however, is happy: though the defects we have referred to may prevent many observers from noticing these points. Some of the window apertures are glazed, so far as the head is concerned, with a single sheet of glass. There is a tower of the usual character, but with a stone spirelet, which, if not unpleasing in itself, is not well combined with the tower-base.—The drawings marked "Design," show an assembly-room with polygonal ends in plan, and a general character as to the galleries, with columns, like a common form in the designs for the Spurgeon Tabernacle. Resemblance to these, also, there is in the staircase over which the end gallery extends. The design may be called Gothic; but it has exaggerated, not to say ugly, details.

The author of "Tubal Cain" has gone elaborately into the subject in a printed general description, but less successfully in his drawings: from the former, something may be learned; but of the latter we have made no note. A third design marked "Floreat Cantabrigia," is Gothic, rather of Continental character, with a dome in which a resemblance to pastry-cook's work, sometimes imputed to designs, is not fancied, but real. The first-floor is remarkable for extent of space filled by windows closely set, and for a projection from the front, with a carriage porch to the entrance.

We do not know how it is that in competition exhibitions, drawings which have merit, but are executed in faint lines, get placed generally in the worst positions; but we have so frequently witnessed this, that we begin to think the occurrence may be referred to fixed laws of the nature of the competition system. The fact alluded to shows that striking *drawing* has still more attention paid to it than is always justified by the art really in question, and by the merit of the design in reference to the objects of the competition. The design marked "Camelia," has at least so much merit as justifies our making its case the opportunity for these remarks. We cannot, however, say from the drawings, whether the author has strictly observed the conditions first referred to, of the ground: but his plan, which throughout deserves careful examination, provides a good entrance to the Assembly-room, approaching from the principal or north front. The room, placed north and south, centres with that entrance; and, east of its portion of the plan, unoccupied ground is left—required as regards Butcher-row, and also with a view to gain light to the school of art, which seems to be placed on the ground floor thereat—the doubtful part of the arrangement. Rectangularity is the principle of the plan, as opposed to that in following the boundaries of the ground in the manner we have remarked upon; and which principle, the latter, is not very successful in results in this competition, even in planning; whilst in some cases it would be fatal to the best perspective effect. The staircase-hall and entrance-corridor arrangement in this plan, whether possible or not under the difficulties of the site, is certainly that which the use of, and the desirable effect in, such a building, should be taken to demand. The stairs are arranged, one staircase on one side of the hall and one on the other, so as to divide the stream and leave access to the ground-floor of the hall: winders however, as here, (and they are top and bottom of each flight,) we have thought fit to object to in such cases. The Corn Exchange has a glass roof, not however showing externally; and it is separated from Wheeler-street, by offices one story in height. The external wall-surface, rusticated in horizontal bands, the alternate courses vermiculated, has peculiar richness and beauty of effect; and the same treatment is continued round the building and to the shafts of the columns, which are as Roman Doric tetrastyle porticos without pediments—one of the number in front of a projection occurring in each of the four streets. A bell-tower is placed at the north-east angle. The portico in the principal front has statues over the columns. After this approval of excellent qualities in the design, (of which the authorship is unmistakable,) it may be well to observe that the porticos border upon the objection of being not sufficiently useful, the columns being applied rather in the manner of those of the Roman triumphal arches. The flank elevation of the Assembly-room building shows a range of lofty arches springing from the entablature of an order, on the low basement, the windows being the height of the columns—so that space for enrichment is left; and the whole elevation is terminated by an effective *cornicione*. Enriched spandrils, and broad angles, complete this part of the design—which slightly resembles the Free Trade Hall, Manchester, though we do not think it due to the same author. The details of the internal decoration, and artificial lighting, are in the same good taste as those of the exterior.

We must complete our notice next week.

Metropolitan Board of Works. — At the ordinary meeting last week, it was resolved, by a large majority, that Mr. Woolrych, the clerk to the Board, be appointed to act as their legal adviser and standing counsel, at a salary of 800*l.* a year, with power to do other business on his own account.

THE ARCHITECTURAL PHOTOGRAPHIC ASSOCIATION.

A SPECIAL GENERAL MEETING of the members of this Society was held on Wednesday last at the offices of the Architectural Union Company, Conduit-street, to receive the report of the committee, recommending the continuance of the Association, to take such steps as might be desirable thereon, and to elect an honorary secretary in the room of Mr. Hesketh, resigned.

The chair was taken by Mr. P'Anson.

Mr. Holmes (who has acted for some short time as interim secretary) read the minutes of the last meeting, which were confirmed, and also the report from the standing committee and the members nominated, at the last special general meeting, to confer with them on the best means of continuing the Association. That meeting was attended by the following members: Mr. Cockerell, Mr. G. S. Scott, Mr. C. C. Nelson, Mr. Thurston, Mr. Lockyer, Mr. Morgan, Mr. Lightly, Mr. Ferrey, Mr. Bury, Mr. Woods, Mr. Cockerell, jun., and Mr. Hesketh. The report, unanimously agreed to, was in the following terms:—

"At a meeting of the standing committee of the Architectural Association, and of the committee appointed by the late general meeting, it was agreed that it is the opinion of this meeting that it is practicable to carry on the operations of the Association on the present basis, but that the committee may find it advisable to make some alteration in the details of the manner of working the Association; avoiding, as far as possible, the present objectionable appearances of trading with responsibilities. It was also resolved that this meeting recommends that Mr. W. Lightly be requested to act as honorary secretary."

Mr. Bury raised a question as to the legality of the proceeding, contending that the proper course to have adopted would have been to dissolve the old society, ascertain and discharge its liabilities (if any), and then hand over what might remain to their successor.

Mr. Lightly reminded the meeting that the committee, and the gentlemen appointed by the last special meeting, had unanimously agreed to the report just read.

Mr. Bury observed that he for one had not agreed to it, although he had not moved any amendment in opposition. It seemed to him that it was not strictly legitimate that architects should unite together for a trading purpose, and subject themselves to censure by the public if the photograph impressions were not all as fine as might be expected. This, at least, was the view of Mr. Tite, Mr. Smirke, and many other leading members of the profession, and he quite concurred with them. Moreover, there was a certain responsibility attaching to the committee which should be ascertained and discharged.

Mr. Hayward said that Mr. Bury could have avoided all responsibilty by resigning his seat on the committee.

Mr. Bury apprehended that Mr. Hayward was mistaken; the debts were 200*l.* the second year in excess of the receipts.

Mr. Holmes said that although the subscriptions might not have been as large the second year as the first, the receipts of the Association were quite as much.

Mr. Wood was of opinion that the present meeting was inconsistent with the conclusion deliberately arrived at a short time ago to dissolve the Association. Personally he had no objection to their going on again, except that it was unprofessional that they, as architects, should identify themselves with a trading company.

After some discussion—

Mr. Hayward moved that the report of the committee be received and adopted. Having been from the first one of the local honorary secretaries, he knew the difficulties that were to be met, and he also knew of the obstacles which had to be surmounted in the first instance. When the Association commenced its operations it was supposed that its only support would be derived from the subscriptions of some three or four hundred architects spread over different parts of the empire, and that the money expended would not exceed some 500*l.* It was soon, however, found that the anxiety of the public to participate in the advantages offered to the profession far surpassed the expectations of the promoters; so much so, that instead of expending 500*l.* they expended 1,200*l.* in the first year of their operations. It was, in fact, the success of the Association which caused it to stop.

Mr. Bury said Mr. Hayward was in error when he spoke of the "great success" of the Association. He believed that in the second year the number of subscriptions had decreased by 300*l.*

Mr. Lockyer seconded the resolution, and remarked upon the circumstance that both Mr. Bury and Mr. Wood had coincided in the view taken by the meeting and the conference, which had agreed to the report now under discussion. As for the falling off in the number of subscribers, he was glad to hear it, as they were embarrassed by the large number they had already.

M. C. C. Nelson inquired whether the meeting had as yet seen its way to getting rid of the commercial difficulties by which the future operations of the Association might be encumbered.

The chairman said that the subject had been very fully discussed at the meeting which drew up the report, and that it would, no doubt, again occupy their attention.

The resolution for the adoption of the report was then put from the chair, and carried *nem. con.*

The next business was the appointment of an honorary secretary in the room of Mr. Hesketh, resigned.

Some discussion ensued as to the power of the meeting to make the appointment, Mr. Wood contending that the committee were the proper persons to appoint the secretary, and not a special general meeting. Ultimately, however,

Mr. Hayward proposed that Mr. Lightly be requested to accept the appointment.

Mr. Hanson seconded the motion; and, after a short discussion, a resolution was passed to the effect that Mr. Lightly be requested to act as honorary secretary in the room of Mr. Hesketh, at whose resignation the meeting desired to record its sincere regret.

This motion was carried unanimously, and

Mr. Hansard next proposed a resolution, that the honorary secretary be requested to convene an early meeting of the committee to consider the state of the funds, and to report generally upon the affairs of the company to a general meeting to be speedily convened.

Mr. Lightly reminded the meeting that it would be impossible to have an exhibition in the coming season.

A desultory conversation ensued with reference to what Mr. Bury called the "irregularity" of the whole proceedings. The impression of the great majority of the meeting was, however, adverse to the opinion entertained by Mr. Bury, and it was urged that the body from whom the report had emanated, although not a numerous one, was important in regard to the professional *status* of those attending. It was also stated that a great number of persons had derived benefit from the operations of the Society, and that it would be a pity to dissolve it simply because certain modifications were required in what might be termed its internal machinery.

The resolution, as proposed by Mr. Hansard, was ultimately carried, *nem. con.*; and, after a vote of thanks to Mr. P'Anson for presiding, the meeting separated.

SIR,—Whereas "a special general meeting of subscribers" was called by Mr. Hesketh, to be held at No. 9, Conduit-street, on the 23rd inst., and at which meeting only *six gentlemen* attended who were unconnected with the committee, and, indeed, were not even subscribers (as no subscription had been paid). These gentlemen elected a chairman, proceeded to pass resolutions, and to elect another secretary, although protested against by members of the committee, who alone were the responsible parties. It is necessary to inform those unacquainted with this unfortunate business, that the committee of the Association are not responsible for any resolutions these six gentlemen may pass, or any liabilities they may incur, as those members of the committee who know how unhappily this Association has worked, as well as the real difficulties and state of affairs, only desire to relieve themselves from further liability and censure of bad faith with the public, to see the accounts clearly made up, and the existing debts paid.

It is much to be deplored that a cabal has been got up to continue ill-judged trading proceedings which were never contemplated, when the committee were induced to assist Mr. Hesketh in a scheme which they thought was for the advantage of the profession generally, and without discredit to themselves.

ONE OF THE COMMITTEE WHO PROTESTED AGAINST THE MEETING.

DRINKING FOUNTAINS: DESIGNS AND VIEWS.

IN continuation of the efforts we have made to induce the erection of drinking-fountains, efforts commenced before the movement was so general as it is now, we have engraved another set of designs, some of which have been executed, some not. It would be amusing, if it were not disheartening to notice the decision with which men of position ignore altogether agencies of which they happen to be ignorant. To take one instance as respects ourselves and the drinking-fountain movement. At the last meeting of the Association for the Promotion of Social Science, Lord Brougham said, speaking of the paper by Mr. C. Melly, describing the fountains erected by his brother, which was read at the Liverpool meeting,—"The council allowed a separate edition of the tract, with the print of a fountain as a model, to be published; and it was extensively distributed during the Congress. The effect has been to spread the establishment of fountains over the whole country, so that there is hardly a great town without one or more. It cannot be doubted that the gratuitous supply of good water, at convenient places, has a tendency to lessen intemperance by diminishing the temptation, and preventing the resort to public-houses; and it is *certain that the benefit thus derived has been entirely owing to the services of this Association.*"

We have the fullest appreciation of what the Association has done: it has no warmer advocate than the *Builder;* but we must, nevertheless, claim for ourselves the credit of a considerable share of the result which Lord Brougham asserts belongs *entirely* to the Association. However, let that pass, as we do with many similar mistakes.

The antiquity of the provision of drinking-fountains, has been recently shown by a quotation from Turner's "History of the Anglo-Saxons," which is worth repeating. "Edwin," says the historian, "had now [*circa* 626] reached the summit of human prosperity. A considerable part of Wales submitted to his power, and the Menavian islands [Anglesea and Man]. The internal police which prevailed through his dominions was so vigilant that it became an aphorism to say, that a woman with a new-born infant might walk from sea to sea without insult. As in those days travelling was difficult and tedious, and no places existed for the entertainment of guests, it was an important and kind convenience to his people that he caused stakes to be fixed in those highways where he had seen a clear spring. Brazen dishes were chained to them, to refresh the weary sojourner, whose fatigue Edwin had himself experienced. In another reign these would have been placed only to have been taken away; but such was the dread of his inquiring justice, or such the general affection for his virtues, that no man misused them."

The two outside designs at the top of the right-hand page, are by Mr. Edward Appleton, architect, and are about to be erected in Torquay,—that on the left side (No. 1) by the Temperance Society, at the edge of the path, in one of the leading thoroughfares; and the other, a wall fountain, by the Local Board, at a cost of about 6*l.* only. The materials used in this are glazed Poole brick, dressed limestone, and Devonshire marble for the bowl. It has a dog-trough. The Temperance Society's fountain is to cost about 15*l.* The lower part is of Dartmoor granite, the small shaft Devonshire marble, and the capital and upper bowl are of Portland stone.

The fountain in the centre at the top comes to us from "One studying architecture in Paris." "It is designed," he says, "after reading some of your remarks on the subject in the *Builder*, to show what might be done in the modern French taste, to be executed in marble, stone, or cast-iron. In the latter case, flat grooved pilasters should be substituted for the round shafts indicated; the lion's head and inscription-plate should be bronze or brass, and the drinking-cups of solid galvanized india-rubber." The engraving on the left-hand side at the bottom (4), shows the fountain which has been put up by some of the inhabitants of Kilburn, on the north side of the North-Western railway bridge running obliquely to the Edgware-road. The background and shell are of Portland stone, with dolphin's head in bronze under it forming jet; the basin and shaft are of veined marble, polished; the base is of Gazby stone, having a large hollow member at the bottom, forming a dog-trough; the waste water running through the basin and shaft, rises on one side of the base, and flows round to the waste-pipe on the other. The cistern is formed in the parapet-wall of the railway-bridge; the background, at top, being cut away, and fitted with a key-stone and rings, to give access to the cistern. The supply is thus kept cool. The centre design at the bottom is one that was submitted by Mr. W. G. Smith to the Metropolitan Drinking-fountains Association, and proposes the use of various coloured materials.

The engraving at the right-hand corner is a view of the fountain recently put up in Norwich, against the wall of the old Guildhall, in the Market-place. Some particulars of this we have already given. Mr. James S. Benest was the architect. The basin and tablet (presented by Mr. C. P. Melly, of Liverpool) are of polished Aberdeen granite; the other portions of Ancaster stone, a band of polished slate being inserted to receive the bowls of the drinking-ladles. The overflow water runs into the trough below, which forms a drinking-place for dogs.

Those on the left-hand page are designs by

DESIGNS FOR DRINKING-FOUNTAINS.——Mr. Henry Godwin, Architect.

Mr. Henry Godwin, architect, who has striven to throw a little more ornamentation into them than is usually done, though of an inexpensive nature, the carving being shown to be bold and plain.

In one of the designs, proposed to be of Bath stone, the voussoirs to the arches are alternately of white and red marble; the basin which stands in the arched recess is of white marble; as also are the brackets on either side for the cups; the back of the recess to be faced with tiles having a pattern of some water-plant in blue upon a white ground. Two recesses for dogs below are proposed, through which the waste water will pass into the drain. Above is a panel for the erector's name, or an inscription. Bullrushes in metal are introduced as a termination to the stonework, with an octagon lamp surmounting the whole, supported by the same plant symbolical of fresh water.

In the other the top of the brackets for the cups is to be of white marble, with the basin supported by a Bath stone pedestal. Dog-troughs below as before in the face of the erection. A metal hood is introduced, supported by ornamental foliated metal brackets, which are continued up against the face of the stonework, tending to give additional support to the projecting hood, and rendering the design more complete. The cups are to be suspended from the brackets by slight chains. The whole is raised on two steps, the arrises of which are rounded off. The Bath stone would be indurated, to resist the action of the weather. Both of these fountains, it will be seen, are proposed to be mural.

It is necessary to mention that the views are not all to the same scale.

Let us add to this article some notes of what has been done in furtherance of the movement since our last account.

London.—A metal drinking-fountain, by the Messrs. Wills, was, on Tuesday, the 15th, opened for the use of the public, in the Regent's-circus, Oxford-street. It is composed of bronze figures, emblems of springs, and of masks of water deities in panels, surrounded with ornament. Above the cistern, from the bottom of which the water runs, a lamp-pillar springs up, at the base of which are four sphynxes. The whole is surmounted by a lamp, crowned with a phœnix. It is the gift of Mr. Samuel Gurney, M.P.

Northampton.—One of two drinking-fountains, presented to this town by Messrs. Frisby, Dyke, & Co., has been erected on the west side of All Saints' Church.

Winchester.—The fountain about to be erected by subscription on the northern side of the railway station road, opposite the Eagle Tavern, by Messrs. M. Macklin & White, for the sum of 45*l.* says the *Hampshire Advertiser*, will shortly be commenced. The design selected by the committee was that of Mr. W. Coles, architect. It is pyramidal in shape, and the materials to be used are stone with coloured brick dressings. The fountain may be said to consist of three stories or parts: the base on the eastern side will be formed of a cistern, intended for the use of dogs, sheep, &c.: above that another stone reservoir for cattle is fixed, to receive the water flowing through the mouths of two lions on a shield. The apex of the fountain is formed of a cornucopia, supported between a group of dolphins, which again rest upon a nautilus-shell, into which the jet of water thrown up through the cornucopia will fall, and pass down through the lions' mouths and cisterns to the drain prepared for it. The lion-headed shield, the heraldic insignia of Winchester, will be encircled in a border of red Fareham bricks, or gauged work, and the remaining surface will be filled with fine bricks herring-boned. The plinth will be of Purbeck, and the sides and coping of Bath, stone. The west side will have no convenience for drinking, but will be perfectly flat.——A fountain has just been erected by the mayor, Mr. W. Hutchinson, at the south-east corner of the City Westgate. It has a Gothic canopy, and the usual conveniences for drinking purposes both for men and animals, and on the face of the upper basin the following distich is cut in the stone:—

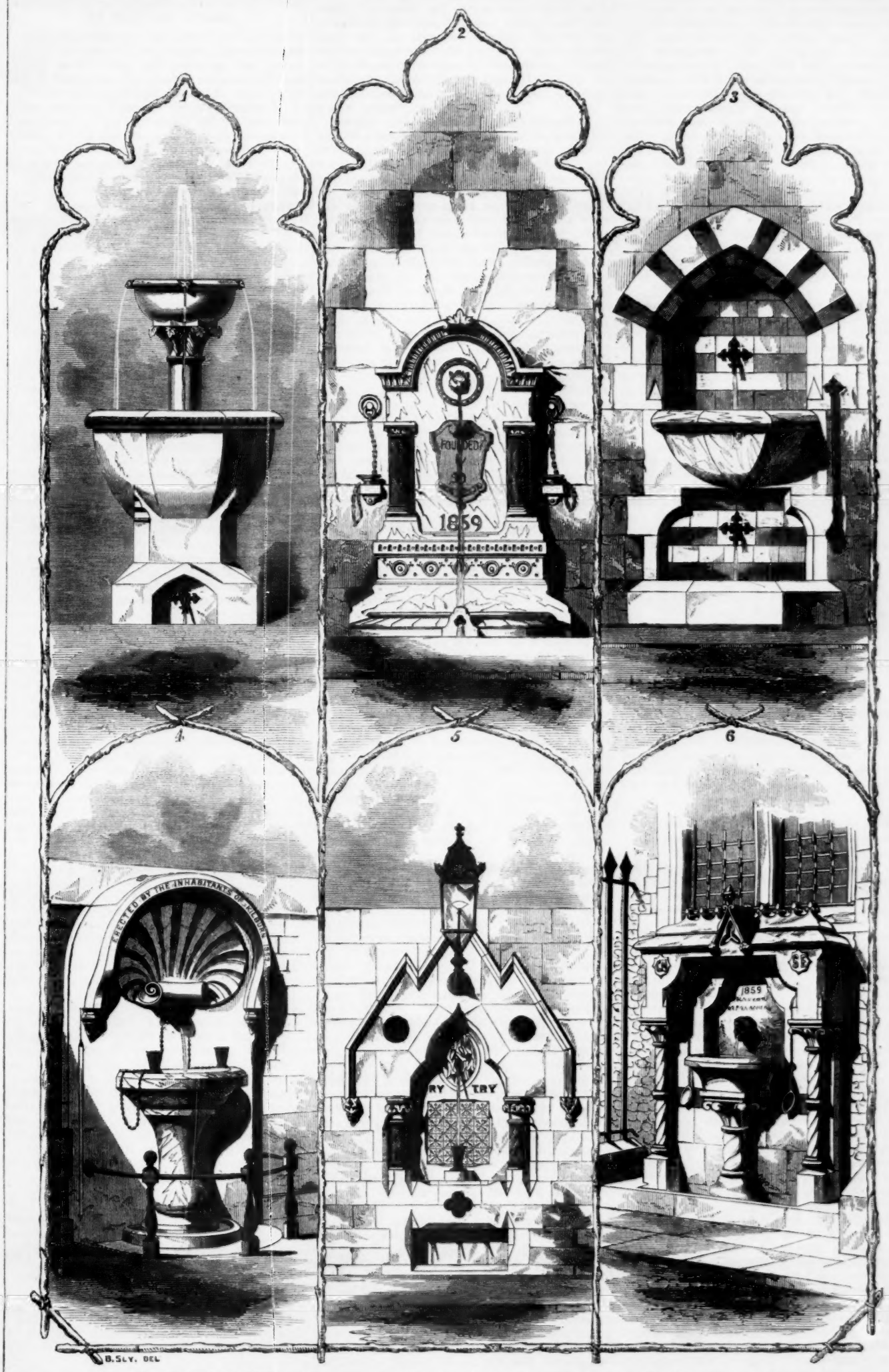
> Drink, friends, drink, and take your fill,
> Do not use my fountain ill.

The design is that of Mr. W. Coles, the City Surveyor.

Bristol.—The drinking-fountain, erected at the expense of Mr. Robert Lang, near the Triangle, Queen's-road, is now completed. The fountain, says the *Mirror*, stands on a raised platform, of three steps, of blue Pennant stone, and is executed in bronzed metal. It is formed with columns at the angles, having a swan on the top of each. Two of the panels are filled with emblematical figures, and the other panels are formed with brackets, representing masks of river gods, to support the cups. The height of the stand for the cups, from the top of the steps, is about 4 feet. Above this rises a canopy, in the form of a vase, which contains the cistern for the supply of water, and from which the water descends through the cone of a shell, the whole height of the fountain being about 9 feet.

Birmingham.—The mayor has caused an ornamental drinking-fountain to be erected under one of the front windows of the Temperance Hall in Temple-street. The design is a canopied niche in the Italian style. Mr. Yeoville Thomason was the architect, and the work has been carried out by Mr. J. Browning. The structure is of Darley Dale stone, fronted with pillars of Aberdeen granite.

Leith.—A fountain has been erected under the superintendence of Captain Grant, at the foot of Leith-walk, on the way from Leith to Edinburgh.



DRINKING-FOUNTAINS.—Designed by Mr. Appleton, Mr. W. G. Smith, Mr. Benest, and Others.

RECENT EXCAVATIONS AND DISCOVERIES AT FURNESS ABBEY.

For some time past, but especially in the earlier part of the present year, workmen have been engaged in trenching and exploring the ground which formed the site of what was once the most spacious and magnificent, and is still, perhaps, the most complete Cistercian abbey in England. As no account of the discoveries has yet been made public, a brief and somewhat general statement of facts, with some speculations suggested by them, is here presented to the readers of the *Builder*.

The partial clearing away of the ruins, and the excavation of the extensive foundations, which had hitherto been completely concealed and unknown, are due to the energy and judgment of Mr. Ramsden, the general manager of the Ulverstone and Furness Railway, which runs quite close to the abbey. During the last spring, however, the alteration of a road, caused by the enlargement of the hotel which overlooks the abbey grounds, added to the above discoveries the interesting and important one of the entire and original plan of the abbey gateway. This structure, which was of immense size and length (not less than 85 feet by 30 feet), stood on the north side of the church and the monastic buildings. The details, consisting of the footings of several buttresses, the lower part of the base course, and one or two transition Norman capitals, prove its date to be contemporary with that of the transepts of the church (about 1170). An outer archway, of considerable depth and span, of which, of course, only the foundations and plan of the jambs now remain, opened into a vaulted space of two bays or compartments. Within, and about one-third of the entire length, a second archway occurred, which was, doubtless, closed by massive doors; for on one side is the space for the wicket or lesser door, the cill of which is quite rounded by the ingress and egress of feet for five centuries. At the extreme southern end was another archway, apparently opening under a tower of great strength, for the walls in this part are of great thickness and solidity. On the eastern side of the wicket is a small square recess in the wall, which either held the porter's seat, or contained the door-bar when withdrawn. A building of some magnitude, and rectangular plan, was continued westward from this gate-house. Its purpose cannot certainly be ascertained, for the present hotel unfortunately occupies this, one of the most interesting portions of the old ruins. Here the excavations were, of course, stopped, though various intersecting walls were found in the space between the gate-house and the small but very beautiful chapel, which still remains tolerably complete at the extreme north entrance to the ruins. Hitherto this chapel has been called the "Abbot's Chapel," from some tradition that the abbot's house was situated hereabouts. As, however, the oblong building annexed to the gate-house was probably the guest-house, and as the foundations of a wall connecting it with the chapel still remain, and one entrance into the chapel is in this direction, it is more likely that this was in reality the "ostry chapel," or chapel of the hostelry. A well of cut masonry was discovered not far from this place, and a wall also of squared ashlar, which extended so deep as to suggest that it may have risen out of a moat, supplied from the adjoining stream, and continued up to the precipitous high ground beyond the great gateway. Within the church itself a good deal yet remains to be cleared away. The choir extended some way into the nave, and was terminated by a stone screen, the foundations of which are yet visible. Even the stone basement which bore the wooden stalls, and (singular to relate) the well-worn stone steps leading up to them on both sides, are yet distinctly to be seen under the nave arch. Of the church itself only the walls of the transepts and the choir still remain with the lower part (about 60 feet high) of a very large and noble perpendicular tower at the west end, which was probably left unfinished at the time of the dissolution. The whole nave has been demolished, but portions of the aisle walls and the main pillars remain. It was on the south side of the church that the great mass of the monastic buildings extended themselves. These were of vast size, and the recent excavations have given every hope that the *entire* plan of a first-class Cistercian monastery may now be revealed to us. It is, of course, earnestly to be hoped that this work will now be prosecuted with increased energy.

From the south-west end of the nave, and at right angles with it, extended a long though rather low building. This room, or hall, was vaulted in the lower story, as a row of pillars indicates. Towards the south end various intersecting walls complicate the plan. A clear spring was found here, built in with cut masonry. Was this the ancient dormitory? At least, the old dormitory of the Benedictine abbey of Peterborough (if that be thought to furnish any analogy) stood in the same position; and it is rather difficult to assign a more probable use.

Parallel with this building, and extending beyond the beautiful chapter-house at the south end of the south transept (which, by the way, was also the position of the chapter-house at Peterborough), runs another long and still more spacious building, which is still to some extent complete. This has been commonly called the refectory; but it could not possibly have been this, for its lower story was vaulted from a central row of pillars, while its sides were lighted by windows, and terminated at the south end by archways opening to the outer air. The upper story, which communicated with the south transept, had long rows of glazed lancets, the place for the wooden frames being quite visible in some. In all probability this was the great dormitory, which had superseded the older on the western side. The lower story formed an *ambulacrum*, or vaulted cloister, such as we find still existing under the dormitory of Fountains Abbey. Two objects in this *ambulacrum* are apt to escape a superficial survey. One is a gardrobe, or retiring-place, only large enough to receive one, built over the main drain, and once inclosed by a wooden door in the interior western wall; and the other is what seems to have been a fireplace at the southern end. Beyond this we come to a very fine building of the best geometric period (*circa* 1270), which is called in the guide-books "The chapel of the guest-house." It was, however, in all probability, no chapel at all (since there is no entrance to it except through the refectory), but either an assembling place for the monks before entering the great refectory, or a smaller dining-hall belonging to the infirmary. This so-called chapel has an upper story, ascended by a newel staircase, though not now easily accessible, and is vaulted within in a very beautiful manner. It contains, however, no vestige of an altar under the east window, nor any piscina, though there is a kind of water-drain which more nearly resembles the base of a lavatory. Immediately to the north-east of this building, and almost touching it, stood the great kitchen, an octagonal building (like that at Glastonbury, but much smaller). It is to be regretted that the entire site of this is not cleared, the greater part being occupied by heaps of loose rubbish overgrown with *Atropa Belladonna*. This kitchen was buttressed at its angles: its fire-place, and even part of its flooring, is visible. From the kitchen, access was afforded through an arched entrance on one side of the supposed chapel, directly into the great refectory, which stretches westward, the southern wall of it being continuous with that of the chapel. The whole arrangements very closely resemble those of a college "buttery." The refectory must have been one of the most magnificent rooms of its date (Early English) in the kingdom. It was fully the size of the great hall of Trinity College, Cambridge, or that of Christ Church, Oxford. The upper walls were arcaded, as the small remaining fragments of it show. The width was about 40 feet, the length about 140 feet. The north-west angle of this noble apartment has fortunately been laid open, together with the basement of the entire south wall. Further excavations will probably reveal the north wall, north entrance, and base of the pulpit. It is strange that this building should hitherto have been called "the guest-house." Undoubtedly it was the great refectory, and it has a close analogy in the hardly inferior refectory still remaining in the Cistercian ruins of Rievaulx. From the vestibule of the building we have conjecturally called the smaller dining-hall, an inclosed way, or rather road, led in a polygonal deviating direction towards the east, where it seems to have crossed the brook, but is there wholly lost. As this leads up to a large archway, midway between the kitchen and the refectory, and from a road which in all probability ran along the east end of the abbey, it is highly probable that this was a covered or inclosed passage for the vehicles which brought up the provisions. The present course of the stream has been altered since the monastic times. A two-arched bridge still remains, under which it formerly ran very close to the east end of the church. Beyond the stream, and close under the cliff of new red sandstone, now tunnelled for the railway, lay a range of buildings of very perplexing character. Some have called them the Infirmary; and it is hard to assign a more probable use, unless, perhaps, some economic purpose was its real destiny. Considerable remains exist here; and, whatever the building was, it was far from unimportant. It was vaulted within, from a double row of pillars, and had a wide hooded fireplace, with a row of windows, opening at the back, quite close upon the cliff, and externally some rather singular recesses. Broken pieces of a millstone may be seen in the floor here; but an entire millstone, much worn on its grinding face, has recently been dug up, we believe, in another part. It formed the lower stone, and is of the usual quartzose millstone grit, of the average size of those still in use. Still southward were other buildings, which baffle all conjecture; and more than one fish-pond or *vivarium*, which seem to have been lined with masonry. At the north-west end of the refectory there is a considerable group of foundations, which have only lately been laid open. A main drain, finely paved and arched with close-jointed masonry, proceeds from this point through the *cloaca* in the *ambulacrum* into the stream already mentioned. The size, cleanliness, and gradual descent of this drain, with the means for flushing it from an upper streamlet, afford a very interesting testimony to the care of the monks in respect of sanitary arrangements. It is not improbable that the foundations last mentioned were those of the *cloaca maxima*, if we may so term the principal retiring-place of the abbey. Several other drains are said to extend laterally with this, which has been opened in two or three points of its course, and is really an admirable piece of masonry. There is a large drain under the kitchen and lavatory, and another under the church.

If this abbey had any enclosed cloister at all, it must be looked for on the south side of the nave; but no vestiges of a cross (or end) wall have yet been found. Nevertheless, there are clear marks of a timber roof or penthouse having extended for some way along the transeptal wall as far as the doorway opening into the south nave aisle. Of the church itself, its chapels, altars, and other interesting appurtenances, we have not now space to speak. Suffice it to say that, as documents show that this abbey was founded in the reign of King Stephen, whereas no part of the present church can safely be placed earlier than about 1170, it is highly probable that the present choir, which is of Perpendicular date, superseded an older one of pure Norman work. For we know that the choir was commonly the first part of a monastic church which was commenced on the settlement of monks in a locality made over to them by a deed of gift.

F. A. P.

PROPOSED INTERNATIONAL EXHIBITION.

The council of the Society of Arts announced through their chairman, Sir Thomas Phillips, on the 16th, that they propose to organize an international exhibition for the year 1862. Speaking of the causes which led them to abandon their previous determination to hold the Exhibition in 1861, the chairman said in his address:—

That decision was arrived at by the Council with much regret. An Exhibition which should present an adequate picture of the progress and triumph of arts and industry, when employed in extending the blessings of peace, and promoting the progress of civilization, might prove of special utility at a season of strife and warfare; and, even if war were again to interrupt the peaceful intercourse of Continental states, it is obviously within the power of the United Kingdom, including the colonies and dependencies of the empire, to produce an Exhibition deserving of national patronage. The progress of art and industry is not suspended, however much it may be interrupted, by actual warfare; and the loom and the forge may pursue their wonted activity even amidst the din of arms. The past history and present position of our country alike impose on Englishmen duties which cannot be evaded with dignity; and they surely may decide themselves whether and when they will hold exhibitions of art and industry, although warlike preparations may seem to occupy neighbouring nations. The war in Italy having terminated, the Council has anxiously resumed the consideration of this important subject; and, notwithstanding the present aspect of Continental affairs, which we do not regard as the most favourable to arts, manufactures, or commerce, it is nevertheless the intention of the Council, interpreting aright, as they believe, the feelings of their countrymen, to originate measures for carrying into effect an International Exhibition of Works of Art and Industry, to be holden in 1862; and they pro-

pose to invite the manufacturers, merchants, public companies, and other capitalists willing to promote such an exhibition, to unite in raising a guarantee fund (not less in amount than 250,000*l.*), to be vested in trustees whose position, character, and qualifications will secure the confidence of those capitalists who are prepared to share the responsibility of the undertaking. It is the intention of the council that full and absolute power to originate and conduct the Exhibition shall be vested in such trustees, and that the permanent buildings which may be found necessary shall vest in the Society of Arts, in order that such buildings may be devoted to future Exhibitions, and when not so occupied may be employed for purposes tending to the promotion of arts, manufactures, and commerce. The trustees will doubtless seek the assistance of her Majesty's Government, in order the better to obtain the friendly assistance of foreign Governments, and secure the co-operation of foreign exhibitors, and otherwise promote the success of the Exhibition of 1862; and will also apply to the Royal Commissioners for the Exhibition of 1851 to grant a convenient portion of the ground, purchased at Kensington out of the surplus funds of the Exhibition of 1851, for the next and future international exhibitions.

It is obvious that the corner-stone of the undertaking is a guarantee fund of adequate amount which shall afford ample protection to the trustees, as well as indicate the favourable opinion with which the undertaking is regarded by those eminent men, in the various walks of active life, who, best appreciating the arts and industry, are ever the most ready to promote the manufactures and commerce of this great country. The subscription to the guarantee fund will be shortly re-opened.

THE GOVERNMENT WATERWORKS, TRAFALGAR SQUARE.

INSTITUTION OF CIVIL ENGINEERS.

At the meeting held November 15, Mr. G. P. Bidder, V.P., in the chair, the paper read was "On the Origin, Progress, and Present State of the Government Waterworks, Trafalgar-square; with a few Facts relating to other Wells, which have been sunk, or bored, into the Chalk Formation;" by Mr. C. E. Amos.

The author commenced by stating that, a good supply of water having been required for the fountains in Trafalgar-square, it was determined, in the year 1843, to carry out a plan which had been suggested by Mr. James Easton. This was so framed as to include the water-supply for the Public Offices. The water was to be obtained and raised by engine-power, from the springs beneath the London clay. The quantity of water required for condensing the steam of the engine being too great to be taken from the main spring, in full quantity, it was considered expedient to use cooling ponds; and it was thought that a small quantity of water in excess of that required for the Public Offices, running continually into the cooling ponds, would keep the water clean, and in a state fit for the purpose of condensation. The basins of the fountains were intended to form the cooling ponds. The water from them was to be taken for the use of the condenser, afterwards to be raised into a cistern, from whence it was to be conveyed to, and be passed through, the jets of the fountains, where, meeting with the resistance of the air, it would be partially cooled and returned to the basin, for further circulation.

Estimates having been made, it was found that the yearly interest on the cost of erection, added to the cost of working, would be less than the sums hitherto paid annually for the water supply to the Public Offices, and that, consequently, the playing of the fountains could be effected without cost to the Government. A contract was then made with Messrs. Easton & Amos for the execution of the works; and a piece of ground having been selected in Orange-street, the works were commenced in January, 1844, by sinking the first well to the depth of 174 feet. A cast-iron pipe, 15 inches diameter, was then driven through 30 feet of plastic clay and 10 feet into a stratum of gravel, sand, and stones, being left standing several feet up in the well. Within this another pipe of 7 inches diameter was driven through 35 feet of green-coloured sand, and 3 feet into the chalk formation, and the boring was then continued to the total depth of 300 feet from the surface. A considerable quantity of water came from the sand, but a much larger supply was obtained from the chalk. A second well was sunk in the enclosure immediately in front of the National Gallery, to a depth of 168 feet from the surface. A pipe, 14 inches diameter, was then driven through the plastic clay, and into the gravel, sand, and stones beneath it. Within this a pipe, 7 inches diameter, was driven through 42 feet of green-coloured sand, and 3 feet into the chalk, the boring being continued to the total depth of 383 feet. The springs were found to be stronger than those in the well in Orange-street. A tunnel, 6 feet diameter, and about 400 feet long, was driven to connect the two wells; the bottom of it being about 123 feet below T. H. W. M. A catch-well, 5 feet 6 inches diameter and 32 feet deep, was sunk just outside the engine-house. A tunnel was driven from it, passing beneath Castle-street and the National Gallery, to contain the pipes for bringing the water back from the basins of the fountains to the catch-well.

The works were finished in December, 1844. Their total cost, as completed, amounted to nearly 8,400*l.* The water rose to within 90 feet of the surface (about 48 feet below T. H. W. M.), and was found to be of good quality. When the engine was pumping 110 gallons of water per minute, it could only lower the water 4 feet in the well.

In 1846, a further demand for water having been made, a larger pump was substituted, which was capable of raising 350 gallons of water per minute from the springs.

In 1849, a second well was sunk in Orange-street, and an engine of 60 horse-power, on Woolf's principle, was erected. The well was carried to a depth of 176 feet, and a tunnel was driven to connect it with the other wells. A bore pipe was driven through the plastic clay, within which it was intended to drive a smaller pipe through the sand into the chalk, and then to continue the boring as in the other wells. But an accident having occurred in driving the large pipe, which allowed sand to come up the bore-hole, and made the water foul, the hole was stopped with bags of clay, and no further use had been made of it, than as a sump well to contain the pumps. The accident was accounted for in this way:—In driving the pipe great resistance was offered by the "hugging" of the plastic clay, and considerable percussive force had to be used. In consequence, several of the screws which held the joints were shaken out, and the pipe having been improperly driven through the layer of gravel, sand, and stones, into the sand beneath, there was an escape of water through the screw-holes, and sand followed in sufficient quantity to cause inconvenience.

The steam-engine worked one double-acting pump for supplying the fountains, and two other pumps for raising water from the springs into the tanks above the building. At an average speed of sixteen strokes per minute, the first could throw 660 gallons, and the other two together 600 gallons per minute. This engine is the one now mainly used. The supply of water from the springs was still found to be abundant. The pumping of 600 gallons per minute lowered the water from 20 feet to 24 feet, when it remained stationary as long as the engine was kept working. The level of the water did not appear to be gradually lowering, and it was stated that on the 1st of December, 1858, it rose to within 66 feet of T. H. W. M., being about the same level as it stood in December, 1847. The author thought there could be no doubt that the greater portion of the water was obtained from the chalk.

He then referred to the fact of the towns of Brighton, Croydon, Deal, Epsom, Ramsgate, and Woolwich, being all supplied with water from the chalk formation. There was an uncertainty, however, of obtaining a good supply from the chalk, as was illustrated in the case of the well sunk at Messrs. Truman's brewery.

ENCOURAGEMENT OF FLORICULTURE AMONG THE OPERATIVE CLASSES.

In these troublous times when strikes and lock-outs jar upon the ear, and are causing want and misery to thousands whose only error has been that they have trusted their enemies,—in these times, I say, it is pleasing to turn aside our regards, and view the working-classes under a different aspect. There is a movement commencing among those classes which does them the highest honour, and which is, I think, calculated to become an inestimable benefit to them. I allude to the growing taste for *floriculture*, which I have reason to believe is gradually, yet extensively, developing itself among the operatives, not only of London, but also of other large provincial populations.

It is most gratifying to find how many families are rendering their humble homes happy and comfortable by this new and permanent source of pleasure, which can be indulged in with perfect innocence, at very trifling cost, and with the utmost social benefit.

I could say something on this subject of what has come under my own observation, but I prefer transcribing the words of one far better informed. Samuel Broome, the well-known gardener in the Temple, who appears to be the main-spring of this happy movement, writes to me as follows:—

"Having some years' practical experience of the increasing love of floriculture among the industrious working men in this great metropolis, I visit hundreds in the course of the year, sometimes at public meetings called for the purpose of hearing conversation as to the best mode of cultivating their show-flowers; at other times at their private homes to inspect their gardens; and to me they are the happiest hours I enjoy, as they are so united and good tempered one towards the other when conversation is introduced about flowers; but if any other subject is brought under notice, such as politics, strikes against employers, &c., then I find a different spirit exist directly, as there are not two of the same opinion: but quite the reverse on floriculture, for they all feel like brothers, and their innocent rivalry never engenders bad feeling: the one that gets the third prize is as pleased as his neighbour who obtains the first.

Allow me to give a few instances of what has come under my notice with respect to some of their gardens. For some years past Mr. Dale and myself have cultivated chrysanthemums in the two Temple-gardens, very extensively, and generally have been successful in having a good blaze of bloom in November, when our gentlemen very liberally throw open the gardens to the public to inspect them: most seasons they are visited by hundreds of thousands, the majority being the operative class, composed of all trades, and I must confess I rarely have a flower touched by any. They inspect the collection with great interest, and ask all sorts of questions as to the best mode of cultivating them. They say, 'Gardener, give me a slip for a pot to grow in the window.'—'Have you any garden?' I ask.—'No,' they say; 'my back-yard will not grow anything, it only does for the dust-hole.'—'I will give you some plants,' I reply, 'if you will try and grow them in it. Tell me where you live; I will come and look at it.' I get the address, and sure enough when I go, it is like a dust-hole, full of ashes, old rags, and rubbish. I say to them, 'Chrysanthemums will grow here, friend, if you form it into a garden. Trench it up well, put in some manure, and make some walks with some dry ashes, and your yard is converted from a rubbish place into a garden at once.' He has confidence in what I tell him, and goes to work. I then give him plants and directions, and in a few months he comes round and says, 'Gardener, I think I beat you; my plants are better than yours; come and see them.' I go and find it the case. The next neighbour follows his example; and so it passes from one to the other, till at last they find they are numerous enough to form a society to show their productions to the public. The wives begin to find their husbands, instead of going to a public-house after taking their tea, are employed at home among the flowers: she also keeps her house cleaned, for visitors calling to inspect them: the children are clean, and are delighted to see the visitors come to see their father's garden; and this teaches them not to touch the flowers at home, and a growing disposition not to do it when out in other places. I have been hailed in a spirit of joy by scores of the wives for persuading their husbands to grow flowers, it being the means of keeping them at home. As they say, it takes up all their time to look after them, and prevents them from spending many a hard-earned shilling in a beer-house. But I must here state that most of them are hard-working men. I rarely come in company with a lazy man that will grow flowers: the more industrious the man, the better he cultivates his flowers: he being of an active mind, must have something to employ it at all times after leaving work: and what is more innocent than flowers? To see the fine productions they show at their exhibitions, would surprise many good cultivators. I often feel ashamed of mine, after seeing what they have produced in some of the most confined spots.

I must apologise for going so much into detail that I fear I may tire your patience in reading; but every word I state is correct. There have been within these last three years no less than ten of these societies started, consisting of from 100 to 200 members, composed principally of mechanics belonging to different trades, and esta-

blished in all parts of London, east, west, north, and south. But, as the old saying is, there is never a good without an evil; and the evil is this.

They have no place to hold their meetings and annual shows in, except at public-houses, and this often keeps them to a late hour from home; whereas, if held at some institution, the business would be done in half the time, and save them many a shilling; as, when they meet at public-houses, they are apt to spend more than does them good, and they get excited. The only remedy to obviate this would be to get every parish round the suburbs to build good-sized rooms in a central part, where they could meet and talk about the flowers, and have a room large enough to exhibit them in afterwards, free of expense, except the gas and firing, and an attendant to keep it clean. I think large rooms might be built very reasonably, with sliding partitions in them for the meetings, and then the whole space thrown open when the exhibition takes place, so that there is plenty of room to see them to advantage: the plainer it is built the better, and it might be used for any other parish meeting. I am sure the parish would lose nothing in the end, for it would not be so burdened with winter rates; and we should have hundreds more members to join them, as at present many dislike belonging to our horticultural societies because they are held at public-houses.

Should you be enabled to promote this object among the thousands of mechanics in this large metropolis, you will, I am satisfied, be effecting a great public benefit."

I might weaken rather than strengthen the case were I to add anything to these simple and honest words of Samuel Broome; but I would remark that, although my friend's zeal may be carrying him too far when he permits himself to expect large permanent buildings to be erected in various parts of London for these unpretending flower shows, yet I cannot doubt that there are many gentlemen holding large business premises in and about London who would not be unwilling to allow a portion of those premises to be occasionally applied to so truly useful a purpose. To the leading builders, for example, I would beg to suggest that it might contribute much to restore peace with their men were they to afford this evidence of their sympathy and good-will.

SYDNEY SMIRKE.

ARCHITECTURE AND GEOLOGY.

OXFORD ARCHITECTURAL SOCIETY.

AT a meeting held on Wednesday, the 16th inst., Mr. James Parker read a paper on the connection between the study of architecture and geology. He began by referring to the sad state of the buildings in the various parts of the country, and especially in Oxford, arising from error in the choice of stones, and showed that from early times it was part of the duty of the master of the works not only to decide upon the stone that was to be used, but even to arrange for its conveyance to the spot where it was wanted. He instanced Canterbury Cathedral as an example in the twelfth century, where stone was sent from Normandy, the district only yielding chalk and flint; but he also noticed the numerous churches built of these materials in the neighbourhood. In the fen districts he considered that the fine churches were owing to the facility with which stone was brought down the rivers from the west. He said we were perhaps apt to look too much upon the choice of stone by the Mediæval architects as a matter of chance; but he thought that it might be shown that far more study was given to the nature of the stone they used than we generally suppose; and that though, as a general rule, the material nearest the spot, or most easily accessible, was used, it was not always so; and that they had rules known to the craft by which they could judge of the value of the stones they found. He then pointed out how, in the true spirit of the Gothic style, the plan and design of the building were adapted to the materials of which it was constructed; and he thought that the marked difference between the buildings before the Conquest and those of subsequent date was not so well described as that between the work of the carpenter and the work of masons. It would be more to the purpose to say that the latter work was that of men who knew how to quarry, and the early work that of men dependent upon the chance surface stones; and in this way he pointed out how many of the features of a Saxon design seemed to be the result of the use of these small slabs of stone. He referred but slightly to the influence which the stone of Ireland had on the buildings there, as this had been recently treated of in the *Gentleman's Magazine* and *Archæologia*. He then read numerous extracts from rolls of expenses of quarries in the Middle Ages, especially those of York Minster, which were very perfect. He explained several of the entries which threw light upon the manner of working quarries in those times. He also quoted extensively from the accounts of Merton and Magdalen Colleges, showing whence the stone was derived for the several parts of the buildings, and thought that an exact investigation of the various kinds of stones used, and the way in which they have severally withstood the effects of time, would not only be very interesting, but also profitable. He then went on to show some points of coincidence simply in the study of these two sciences. He laid great stress upon the principles of construction which Dr. Buckland pointed out in the ammonite as being identical with those adopted in Gothic architecture, and explained by several specimens the argument made use of in the Bridgewater Treatise, in which the Gothic style is more than once referred to, as affording illustrations of the mechanism of some of the extinct species of animals. He said that, as in the geological specimens, it had been shown that the features which might at first sight be regarded simply as ornamental, and for the purpose of beauty, did in reality contain deep and true principles, which rendered them most applicable to the purpose for which they were intended. So in Gothic architecture many of the features which we are apt to regard only from an architectural point of view, such as the arch and vault, were in reality the natural results of the true application of nature's first principles to obtain a certain given result. And it is from Gothic architecture in these her principles, and not only in her forms, approaching so much more nearly to nature than other styles, that he believed arose the charm which, to the eyes of so many, hangs round a true Gothic edifice. Before concluding, he showed the connection in the very grammars of the two sciences, comparing the primary, secondary, and tertiary, preceded by the, igneous to the first, second, and third Pointed, preceded by the Norman, on which the others rested, if indeed it could not be said from which they were developed. He concluded by saying, "In the stone of the quarry, marked by the impressions of living things, if we will read faithfully and carefully, we can trace the history of the earth; so in the stone of the building, marked by the chisel, if we will but care to open the book rightly, we can read the history of our country. English architecture does not present a series of men's fancies, any more than the strata of the earth presents, as was thought some years back, a series of 'Lusus naturæ.' And so we should study architecture as an historical truth, not as a mere matter of art. We should bring to bear upon it the same research and the same labour as is bestowed on geology, and adopt the same care in arriving at conclusions. Nor do I think we should despise the former, simply because its pages but lay before us the history of scarcely a thousand years, while the latter science opens to our view millions. Both histories deserve study, and both, I think, may dvantageously be studied together."

OUR SHOWS.

IN these struggling and pushing times we have lost sight of many old observances which were kindly and cheerful in their nature, and were the means of bringing persons more closely into friendly contact. We have too few holidays—too few rests from labour, which can be looked forward to with hopeful pleasure, and, in consequence, sweeten labour.

Ancient ceremonials which have continued in use for many generations are unfashionable and laughed at to a greater extent, in most instances, than is wise. The old picturesque official costumes of officers of justice and corporate authorities are falling into disuse, and it is not unlikely that those peculiar robes which are a means of distinction, and have an impressive effect upon a large and even intelligent part of the community, will, ere long, become amongst the matters of the past. It is said that these robes and decorations are not in the spirit of the age; that people are careless of such matters. It is, however, a fact that, when the Queen goes in state to Parliament, immense multitudes assemble, who evidently enjoy the show. On the last Lord Mayor's Day, although the procession could neither be said to present much of the quaint aspect of the past, nor to be such a spectacle as might be presented in these times, countless thousands thronged the long line of that procession which, for centuries, has in various forms been one of the means of stimulating many to those exertions which have ensured success in business. The last procession afforded some curious instances of the changes of the times. The dingy scarlet coats of the watermen showed signs of decadence, and ordinary chimney-pot hats were substituted for the picturesque velvet caps: even the beadles had assumed this head covering, which did not at all correspond with the other antique part of their costume.

The Lord Mayor's carriage, rocking and lumbering along, its paint and gilding tarnished and faded, contrasted strangely with elegant modern equipages. The heraldic figures on the banners had lost the antique cut, and, although rudely done, were evidently painted from the knowledge gained at the Zoological Gardens rather than from the heraldic conventionalism of other days. There were other things of singular note, which excited some laughter, and made many say that it is time the Lord Mayor's Show was ended. We differ from that opinion. Like the triumphal processions of the Romans and Athenians, this civic triumph would have its use, provided it was managed in a proper manner. We want holidays. We want shows.

WATER FOR LONDON.

IF, as we believe is the case, fifty million gallons of water per day are taken from above Teddington-lock for the supply of certain districts of the metropolis, it is certain that this must materially affect the force of the river. Large as this body of water is, it is trifling compared with the amount of the surface and other drainage which is passed daily into the Thames.

It is stated on good authority that the water supplied for the use of more than two millions and a half of people, horses, cows, street watering, &c. &c., is about one hundred million gallons daily. This large supply will, if the main drainage be efficiently carried out, be taken from the land or "back" water of the river.

Captain Claxton, R.N. estimating the quantity of water in the Thames, from above Putney down to Shadwell or thereabouts, calls the length 14 or 15 miles, and multiplying the feet by 600 for average breadth, and again by 21 feet for average depth, the sum will be about 3,000,000,000 (three thousand millions) of gallons. These figures, if nearly correct, show that about one-thirtieth of the whole water at present in the River Thames will be withdrawn, on an average, each day. This cannot fail to greatly injure the current, and calls for immediate measures to be taken for the purpose of preventing serious mischief, which it would need a large sum to remedy.

During the drought of this summer there was for some time no water passed over the Teddington-lock; and although the heat of the present summer is much above the average, it is certain that, year after year, the land water of the Thames will lessen, and the tide gradually reach a lower level, so that in course of time "Father Thames" himself will be troubled with thirst, and will in various ways appeal to those by whom he has already been so ill-used, after long and faithful service. He will require fresh streams to invigorate him; and at the same time skilful measures must be taken to prevent any useless waste of new supplies. The embankment of the Thames is a matter of immediate necessity. If it is deferred, there will be a mass of accumulations which it will be a costly work to remove.

At the present time, the very imperfect plan in use of deodorizing the sewage, costs 20,000*l.* a year, and the flushing of the sewers costs 20,000*l.* a year more; in six years the cost of this would amount to nearly a quarter of a million sterling, if even it should not be necessary to resort to much more expensive means of deodorizing the poisoned water of the Thames. A similar large expense will arise if the embankment be not soon carried out and means are not taken to increase the supply of land water.

If we consider the constant increase of the population, it is evident that before thirty or forty years have expired, if other measures are not used, we must, instead of fifty millions of gallons, have not much less than one hundred millions of gallons of water from above Teddington-lock. The towns* near to and upon the banks of the Thames will also increase in population, and of course more water will be extracted from the river.

Again, when we consider that the population of the metropolis will, at the present rate of increase,

* A list of the chief of those towns and their population is given in the "Memorials of Father Thames," which appeared in an early volume of the *Builder*.

be five millions in about forty years' time, it is evident that the present arrangements for the water-supply of the inhabitants will be quite insufficient. Moreover, the increase of sanitary knowledge will not permit the impurities which at present exist. In a recent report on the condition of the water-supply, the amount of impurity was stated as follows:—

	Total Impurity per gallon. Grains, or deg.	Organic Impurity per gallon. Grains, or deg.
Chelsea	14·92	0·80
Southwark and Vauxhall	16·64	1·76
Lambeth	16·20	1·30
Grand Junction	17·32	1·08
West Middlesex	16·72	1·48
Other companies:—		
New River	17·00	1·60
East London	20·00	2·60
Kent	20·00	1·30

Although the varieties of water above mentioned are purity in comparison with that of the pump in St. Thomas's-street, mentioned in the same report, which contains a total impurity per gallon of 89·70 grains or deg. and organic matter, 10·40! still, the impurities of the metropolitan water must find a remedy.

The diminution of the water of the Thames requires the most careful consideration. We should be perfectly assured of the extent of the evil, and look forward to the changes that will occur during the next half century. The sources from which pure water can be had for the supply of the rapidly-growing metropolis should be examined; and, if it be found necessary, measures ought to be taken to feed the Thames with water. We have before hinted at the possibility of bringing a water-supply from the Severn! This, and other plans which have been suggested for the improvement of the river and the supply of this vast population with one of the elements of life, should be examined into and considered in that unprejudiced and intelligent manner which the advancement of the present times and the nature of the circumstances require.

This matter is of very great importance: many have schemes on the subject, but very little is really and practically known. It would be most useful to take measures for a systematic and scientific inquiry into the subject. If such a commission were appointed, it should have instructions to look at the matter with a view to meeting future contingencies, and putting to one side old-fashioned ideas, considering that we live in the days of advanced science, railways, and the electric-telegraph; it should devise measures which would be permanently effective, and not suggest plans which might do a little good for a time, but which would soon become a constant source of expense.

WORKS IN IRELAND.

A NEW Roman Catholic Church is to be built at Tralee, and another is being erected at Killenaule, diocese of Cashel, from designs by Mr. J. J. M'Carthy, architect. The front elevation of the latter displays a central and two side gables for the nave and aisles respectively; and in the former is a cinqfoil-headed, splayed, moulded, and richly crocketed doorway, with five-light traceried window above; and the latter have smaller doorways of similar character, but ornamental portions omitted, and three-light traceried windows above. A tall spirelet rising from a buttress, and terminated by a metal cross, is introduced in an attached building.

New schools are being erected in connection with Killarny Cathedral. A new market-house and town-hall are to be built at Navan.

About 11,000*l.* have been already expended on St. John's Roman Catholic Cathedral at Limerick, and much more is required to complete it. The plan is cruciform, with nave and chancel 168 feet by 30 feet; aisles 20 feet in width; transepts 114 feet across; two small chapels at each side of high altar, and two sacristies communicating and displaying with the gable of chancel nine gables on east elevation; a tower and spire adjoining transept, and an entrance porch. The transepts and chancel have each five light, tall, trefoil, lancet-lights: traceried wheel-windows light the chapels, and two-light windows the sacristies and aisles. Externally the building contains many pleasing features, the outline being very much broken, and the tower, with its stage-lights, louvred and traceried belfry windows, embrasure parapets, &c., and crocketed spire, will contribute much to the *toute ensemble*. Mr. Philip Hardwick, R.A., architect, London, designed the building.

In addition to the works previously mentioned in the *Builder* with reference to Mr. Pollock's gigantic steadings in county Galway, there have been erected an Elizabethan residence for the proprietor, eight farm-houses, mills, stores, tradesmen's shops, limekilns, stewards' and labourers' cottages, &c. &c., comprising upwards of forty miles of stone walls. Mr. William Maxwell, agricultural engineer, directed the works. The total cubical contents of all the building is 756,224 cubic feet, at an average cost of *less* than 2d. per cubic foot. The steading is lighted with gas by Messrs. Edmundson and Co., of Dublin. The Ecclesiastical Commissioners announce that they are about having extensive works executed at the Church of Ahamplish, county Sligo, according to plans, &c., by their architect, Mr. Welland. The same body has at present—together with numerous other works—a new church in course of erection at Waterville, county Kerry, and has just completed a tower and spire at the new church of Kenmare, county Kerry. Mr. D. W. Murphy, of Bantry, is the builder.

Mr. Percy is to be the contractor for building the breakwater at Galway harbour, and contemplates the laying down of a line of rail from Ennis direct to that town.

PERNAMBUCO.

Pernambuco Railway. — The works of the second section of the Recife and Saõ Francisco Railway, have been carried on under the direction of the company's engineer, Mr. Penistone, since February, 1859, in which month the works were taken out of the hands of the contractor, Mr. Furness. It is unfortunate that there should have been misunderstandings between the company's engineer and the contractor, as there are prospects of the lawyers reaping a harvest, several lawsuits being at this time in process between the parties, from which it is not at all likely that the shareholders will derive benefit. The tunnel near Villa da Cabo is the heaviest work on the section, and it seems probable that the accidents which have occurred during the heavy rains in May will cause the completion of the tunnel to be at a later period than is desirable. Allowances must be made in every calculation respecting works carried out in the Brazils, for the contingencies which will arise in consequence of scarcity of labour and material, and the neighbourhood of Pernambuco seems to be prolific in such contingencies. The workshops belonging to the railway company, at Villa de Cabo, are very complete, especially in the smiths' and turning shops, and saw-mills.

Pernambuco Gas Works.—These works have been in operation since the month of May, 1859, and the demand for gas is steadily increasing. The city is lighted by one thousand street lamps, and thirty miles of mains have been laid down, varying from 18 inches to 3 inches in diameter.

Pernambuco Baths.—This establishment, with separate hot and cold water baths, reading-rooms, &c., all lighted with gas, and convenient in arrangement, is meeting with the success it deserves, and the proprietors contemplate the erection of a large lavatory for washing, drying, and ironing clothes by steam and machinery. This will supply a want which is greatly felt in the city and its neighbourhood.

AMERICAN AND CANADIAN NOTES.

Montreal.—The Daily Wisconsin says that the Victoria bridge seems "the synonyme of permanence and substantiality, but has no beauty save that of massive strength, not often appreciated in America." So it would appear, judging from wholesale fatal accidents caused by viaducts, bridges, &c. falling! The first suggestion of a bridge across the St. Lawrence originated thirteen years ago with Mr. John Young, a capitalist of Montreal. Engineers reported favourably, notwithstanding the great width of the river,—two miles; and in 1854 the work was actually commenced. Robert Stephenson is believed to have been paid 225,000 dollars for the plans. American engineers say that "the English, in the matter of tubular bridges, only know how to build them, and to squander money on them." "Stephenson," they say, "scouted the Niagara Suspension-bridge, but Roebling built it for 400,000 dollars:" the Victoria has cost nearly 7,000,000 dollars. The spans are 250 feet each; but American engineers say that by making them 500 feet, the stability would not be impaired, and a saving of 1,500,000 dollars be effected. Our readers are already aware of the particulars of construction. It is in contemplation to build a footway on the outside for pedestrians. The Grand Trunk railway is said to be in every respect the noblest railway in America. Every thing about it is said to be "British and solid;" the embankments and bridges substantial, the culverts wide, the station buildings neat and commodious. The telegraph follows the line everywhere.

Brooklyn. — The new Academy of Music is about being erected in Montague-street, near Court, and will cost 180,000 dollars, the whole of which in Capital Stock has been subscribed.

Toronto.—The new University building is the finest in the country, except the Capitol at Washington. It is in the Mediæval style, with a frontage of 400 feet, a right wing 285 feet, and a left wing 273 feet. The towers are 110 feet in height, and the pinnacle 165 feet, about ground level. Externally it is built of fine grey stone, mostly from Cleveland, Ohio; and the dressings, &c. are of Caen stone. The roof is covered with Canada slate, and in tile fashion. Interiorly the building contains a main vestibule for entrance, promenades, &c.; a convocation hall in right wing, elaborately decorated with traceries and carvings by a Swiss artist, and floor inlaid with encaustic tiles from Shropshire (we presume Minton's); a senate chamber for meetings of the Faculty, with magnificent stone fire-places, and stately carved mantelpieces; a public and a student's reading-room; a library finished in white oak; a museum of natural history, decorated with black walnut carvings; a surgery; a laboratory, finished with blue and gold in antique style; lecture-halls, recitation-rooms, an immense dining-hall, with culinary offices, &c. below; students' quarters, suite of apartments for Dean of the University, &c. The grounds contain about twenty acres, and there is a botanical garden, and an observatory, with mounted telescope attached. The cost is said to have been 500,000 dollars.

LIVERPOOL ARCHITECTURAL SOCIETY.

AT the fortnightly meeting of this society, on Wednesday, 16th, Mr. Horner (president) in the chair, announced that the prize for the best set of sketches of real objects had been awarded to the author of the set signed "Palmam qui meruit ferat." Mr. Frank Howard exhibited the drawings of a design for a stained-glass window, representing the Transfiguration, with three of the apostles beneath, intended to be erected in a church near Falkirk. Mr. Howard also read a paper, "On Education in Art." He endeavoured to show that the mere placing of works of art before the artist, amateur, or the public, would not educate them. They would have to learn or to be taught what constituted the merits of works of art, and then to seek for their merits in whatever might be placed before them, or to have those merits pointed out and explained to them. The right of the amateur to independent criticism would be correlative only with his education in art. During the evening Mr. Picton alluded to a visit he had recently made to Lichfield Cathedral, and adverted to the practice of whitewashing ancient stonework in ecclesiastical structures. A discussion followed, in which the chairman and Mr. J. Hay took part.

CHURCH-BUILDING NEWS.

Rochester and Chatham.—The new church of St. Peter, Troy-town, recently consecrated, has a site hemmed in by houses, chiefly of an inferior character. The architect has consequently devoted his attention chiefly to the interior. The plan consists of a nave and chancel, terminated at the east end by a multangular apse; a western vestibule, giving access by spacious doors to all parts of the church; a fourth aisle, extending westward to the chancel; and a children's aisle, conterminous with the latter, together with a vestry and entrance filling up the south-east angle. The length of the nave and chancel from east to west is 90 feet, and the width 30 feet: a flight of seven steps divides them, there being no chancel arch, and the roofing is carried at one elevation throughout. The height of the nave walls is 42 feet, and to the ridge of the roof from the floor 64 feet. The south aisle is 24 feet wide, and is divided from the nave by three arches, each of 20 feet span, supported by round stone pillars with boldly foliated capitals. The roof of the aisle is framed after the manner of groins, being arched both ways. The fall of the ground has been utilized internally, giving greater elevation to the chancel and children's aisle, which are entered at a level from the vestry door. A gallery has been erected at the western end of the nave. The architectural decoration of the interior is chiefly confined to combinations of coloured

bricks and tiles, which have been freely used instead of stone-work, but also enriched by carving on the capitals of the pillars and the corbels, all of which has been executed by Mr. W. Farmer, of London. The general effect is also enhanced by stained-glass windows on the apse and at the western end, which have been executed by Mr. Hughes, of London. The seats are all open, and the church is capable of accommodating 592 adults on the ground-floor, 92 in the gallery, and 139 children at the eastern end, making a total of 823 seats. The church is built of rag-stone, coursed and dressed with white and red bricks. As regards the architectural character of the church, it cannot be said to belong exactly to any of the usually recognized periods of Gothic architecture, as seen in the old buildings in this country: it is nevertheless founded on that of the thirteenth century. The total cost of the building, inclusive of extra foundations, has been about 4,500*l.* The architect is Mr. E. Christian, of London; and the builder Mr. A. Stump, of Brompton.

Bristol.—Mr. S. W. Lucas, of Birmingham, has offered the sum of 500*l.*, provided nine other gentlemen will give a similar sum, towards the restoration of Saint Mary Redcliff Church. One gentleman has offered a second 500*l.*, and Mr. Churchwarden Powell has stated that he will give 100*l.* per annum for five years.

Byton.—The church of the parish of Byton, near Leominster, which was burnt down about two years ago, has been rebuilt, says the *Hereford Times*, under the direction of Mr. T. Nicholson, diocesan architect, by Mr. T. Bannister, of Hereford. The new edifice, which is in the Early English style, consists of a nave, chancel, and south porch. The nave has a double window at the east end, divided by a buttress; four single lancets at the sides; and a transeptal arrangement at the east end, pierced with two light windows. Broseley tiles have been used for the external coverings, and the floor is laid with a pattern of Godwin's encaustic tiles.

St. David's (Brecon).—The new parish church of St. David's has been opened. The edifice is in the Gothic style of architecture of the thirteenth century. It consists of a nave, chancel, and tower at the west end. The walls are built of stone from the district, finished with Bath stone dressings to doors, windows, &c. The extreme dimensions of the interior are about 90 feet in length by 25 feet in width. There are about 300 sittings, a considerable portion free. The floor of chancel, aisles of nave, &c., are laid with tiles of an enriched pattern, from Mr. Godwin's manufactory at Lugwardine, near Hereford. The windows to chancel, comprising an east window of three lights, with enriched tracery to the head, and two smaller side windows, are filled with stained glass. The larger or east window has the leading events connected with our Saviour, viz., the birth, crucifixion, and resurrection. These were executed at the manufactory of Messrs. Clayton & Bell, London. The remaining windows are filled with Hartley's patent glass. The cost of the church exceeds 1,300*l.* The building was erected from the designs and under the superintendence of Mr. John Clayton, architect, by Messrs. Williams, the contractors.

Hunslet.—The foundation-stone of a Roman Catholic Chapel, to be dedicated by the name of St. Joseph, has been laid at Hunslet. A Roman Catholic mission is said to have been first established in Hunslet about five years ago, and now there are, it is alleged, about 1,000 Roman Catholics there. The chapel, which is to be erected on a plot of land near the Leeds and Wakefield road, is intended to accommodate 560 persons, and will be in the Gothic style of architecture, and constructed of ornamental bricks, with terra-cotta dressings. Messrs. John Child & Son, of Leeds, are the architects, and the edifice, including the price of the land, will cost about 1,500*l.* Messrs. Richardson, Moses, & Greenwood are the contractors for the masonry, brickwork, &c.; and Mr. Brunton for the plastering. It is intended to raise money to build a school and residence for the priest.

Sheffield.—St. Mark's Church, Broomhall district, has been opened. This is an iron edifice, erected by Dr. Sale. It has cost about 1,400*l.*, exclusive of the ground, fences, &c. Mr. Hemmings, of London, was the contractor. The length is 90 feet, and breadth 50 feet, with side aisles; the fittings being of the ordinary kind, and the walls being covered with painted canvas. There are eats to accommodate 625 persons.

Lanark.—The new Roman Catholic Chapel, recently erected at Lanark, and consecrated on the 10th inst., is in the Early Decorated style, and consists of nave, aisles, chancel, mortuary chapel, and tower, with attached sacristy and manse. The edifice is about 112 feet long by 52. The carving and decoration, as well as the numerous statues in the nave, were executed by Messrs. Lane & Lewis, of Birmingham, from designs by Mr. G. Goldie, the architect of the building. Above the chancel-arch there is a large fresco of the "Last Judgment," painted by Mr. Henry E. Doyle, from whose designs all the coloured decorations are carried out by Mr. Early, of Dublin. Amongst these the ceiling of the chancel is the chief. Most of the windows are filled in with stained glass by Mr. Wales, of Newcastle, and Mr. Ballantine, of Edinburgh. The site selected for the chapel is one overlooking Lanark and the Falls of Clyde. The whole expense of the building has been borne by Mr. Monteith, of Carstairs.

SCHOOL-BUILDING NEWS.

Llanarth (Cardiganshire).—The contract for the new schools here has been taken by Messrs. Griffith & Thomas, of Aberaywn, and the works are to be completed forthwith. The Committee of Council and National Society are liberal donors to the work. The buildings comprise a school-room, 60 feet by 18 feet; lobbies, offices, and master's residence complete. The whole will be built of local stone, with red brick bands, Bath stone dressings, &c. The architect is Mr. Withers, of London.

Guernsey.—The school adjoining the Catholic Church is being built. The walls are completed, and the roof is being covered in. The architects are Messrs. Hadfield & Co. The cost is 300*l.* The dimensions are 30 feet by 20 feet. The style is Gothic, with Caen stone dressings to the windows, executed, with those to the door, by local masons. There are three windows and one door: one window in particular is a fine one, with foils, &c. The edifice is plain, but neat.

THE ARCHITECTURAL MUSEUM.

THE following communication has been addressed to the committee of the Architectural Museum:—

"Gentlemen,—There can be but little doubt that the general subject of architecture is increasing in interest with the public, who, however, although they hear much discussion on the different styles and their varieties, know little about them. Probably they would wish to know more. Under the assumption that the society would desire to assist them to this knowledge as much as possible, I venture to submit to you the following suggestion:—

That, as regards the architectural section of the Museum at South Kensington, one method might be to place a single screen down the centre of the whole length of that part of the above section which occupies the west gallery; the present cases occupying the centre being removed temporarily to the sides. The screen to be hung on both sides with groups, chronologically arranged, of engravings, drawings, and photographs, with descriptions, and references to cards, &c., so as to form an epitomé illustrative of the different styles of architecture of various countries and periods, ancient and modern.

In case of your entertaining this idea, I have ascertained that the Department of Science and Art would be ready to assist with such stores of illustration as they possess.

I beg to add that I am in no way officially connected with the Department, but venture to submit the above solely as one of the public.

JOHN BELL."

SOUTHWARK WATERWORKS.

SIR,—I beg to state, for your information, that as I was passing the reservoir of the Southwark and Vauxhall Waterworks, in Battersea-fields, one day last week, I saw, to my great surprise, what appeared to me a supply of water gushing from the Thames, at that part, as it was just high water, and the colour of the water coming in was exactly the same as that in the river outside, and a little *below* the *level* of the river. Now, if there is an *outlet* pipe from the reservoir to the river at *low* water, that same pipe can be used as an *inlet* pipe at *high* water, and thereby the reservoirs can be filled with *impure* water, which, however filtered from all organic matter, cannot be deprived of its liquid poison any more than you can turn vinegar into spring water by filtration: and, moreover, the Act of Parliament *compels* them to take the water from a much higher source, so that *every* communication with the river at Battersea ought to be completely prevented, so as to preclude the possibility of their taking *any* water from that part of the river; as, if *that* is not done, there will always be a suspicion that, in order to save expense or trouble, the public, in the parts which this company supplies, may occasionally be treated with a very impure supply of half-and-half, if the Thames at Hampton should be rather low or deficient in water, and thereby render the Act of Parliament null and void, and again have the health of the district placed in jeopardy. AN OBSERVER.

EXCESS OF QUANTITIES: RESPONSIBILITY OF ARCHITECT.

MR. H. P. BOLT, builder, of Newport, says the *Hereford Times*, has just been awarded the sum of 199*l.* 15*s.* 8*d.* expenses, for excess of quantities furnished by Mr. R. G. Thomas, architect of the new English Baptist Chapel, Commercial-street, of which Mr. Bolt was the builder. Prior to the commencement of the contract, Mr. Bolt was furnished with a bill of quantities by Mr. Thomas; and, as we learned from the evidence given in the action thereon at the last Monmouth assizes, the architect assured the builder, on his signing the contract, that the bill of quantities furnished was quite correct. As the work proceeded, however, Mr. Bolt found, to his astonishment, that the quantities furnished were anything but correct. Not being able, under his contract, to sue the chapel committee, he had no alternative but to apply to the architect for payment of excess on incorrect quantities. Being unsuccessful in his application, he thereupon sued the architect, and obtained a verdict before Mr. Justice Byles, at the Monmouth assizes, adjudging the architect liable to the builder for excess of quantities; such excess to be referred to arbitration at Gloucester.

AN ARCHITECTURAL RIFLE CORPS.

SIR,—In answer to the letter from your correspondent, "A. W.," as to the formation of an architectural corps, we take the liberty of enclosing the accompanying letter to show that, so long ago as June last, steps were taken to enable members of the profession to form, at least, a nucleus for a corps.*

We beg to add that since then the Highgate corps, including several members of the profession, has been enrolled as the 14th Middlesex, and is now in a state of great proficiency. The first company is nearly full, but there is ample room for a second, third, or any further number of companies, which may be formed of architects.

Members of the profession, desiring any further information, may obtain it by application to Josiah Wilkinson, esq., commanding officer, 2, Paper-buildings, Temple; R. Clarke, esq., honorary secretary, 14th Middlesex R.C., Albany-road, Highgate-rise; or ourselves, who acted as honorary secretaries at the meetings of the 30th June and 8th July.—We are, &c.,

JAS. S. DONALDSON, M.I.B.A.
MATT. WYATT.

Bolton-gardens, Russell-square.

THE STRIKE.

THE following propositions have been forwarded to an influential member of the Masters' Association by the Masons' Committee, viz.:—

"Masons' Committee-rooms, Sun Inn, Mason-street, Lambeth, Nov. 11, 1859.

To the Master Builders' Association of London.

Gentlemen,—We have the pleasure of forwarding you propositions for the final adjustment of the existing dispute:—

1. The masons are prepared to resume work on the same terms as when 'locked out' on August 6.
2. The masters to dispense with the 'declaration.'
3. The masons are willing to resume work with those of their own trade or others who may have accepted the 'declaration.'
4. The masons will work in strict conformity with the law of the land.
5. The masons of London are willing to enter into a discussion of their by-laws, to be represented by six masons with six employers, and should the masters and the operatives not agree to the satisfaction of both parties upon any point at issue, the matter to be decided by a chairman selected from the following gentlemen: Sir Charles Barry, Mr. P. C. Hardwick, Mr. Digby Wyatt, Mr. J. Vulliamy, Mr. G. G. Scott, and Mr. W. Butterfield.

* "At a meeting held on Thursday, the 30th June, 1859, at Bolton-gardens, of several junior members of the architectural profession, it appeared to those present desirable that junior members of the profession should become members of some rifle corps, and they were informed that a favourable opportunity presented itself of joining the Highgate Volunteer Rifle Corps, which was now in course of formation, and numbered about fifty members.

A meeting was accordingly held on Friday, the 8th of July, to consider further steps, and to receive the names of such junior members of the profession as were disposed to join that corps."

6. The masons of London wish it to be distinctly understood that they have withdrawn from the Conference, and that they give up the strike at Trollope's for the nine hours, it being considered by them useless to contend longer upon that question.

7. Several attempts having failed to bring about a reconciliation with the master builders (for all parties) we respectfully solicit the employers to dispense with the 'declaration' from the masons.

Signed on behalf of the Masons of London."

On Saturday a deputation of delegates from the Shaftesbury Hall meeting — consisting of Mr. Heap, amalgamated engineers; Mr. Murray, West-end bootclosers; and Mr. Dunning, bookbinders—waited upon the masons' committee, for the purpose of endeavouring to effect a reconciliation between the masons and the Conference, who, as our readers will doubtless remember, have for some time past been acting independently of each other. The delegates faithfully discharged their duty, but failed in their object, as will be seen by the following resolution, which was subsequently unanimously adopted by the committee, viz.:—

"Resolved,—That it is the opinion of this committee, after hearing the deputation from the Trades' Delegates, that the conduct uniformly displayed towards the masons and the committee by the Conference, in having discharged our representatives without even giving them a hearing, when their only implied fault was a sincere wish to settle the present deplorable dispute, and the several public statements designedly made by some of the leading members of the Conference to damage the reputation of the masons; and, finally, suspending us from all participation in the Lock-out Fund, constitutes a series of acts of such an arbitrary nature, that we deem it impolitic and undesirable to connect ourselves with that body again."

Sir, — In the *Builder* of last week there appeared a communication signed "A Master Builder," the avowed object of which is to impugn the correctness of a statement made by me at Brighton, to the effect that "workmen were not pressed to belong to societies, neither did the society men strike against non-society men."

In disproof of this statement, "A Master Builder" instances "three society bricklayers" who "on the very same day were convicted at Lambeth police court for depriving a non-society man of his right to labour." "A Master Builder" finishes his letter by saying, "Alas! that, in 1859, workmen should be content to follow such a leader!"

Permit me in reply to observe that "A Master Builder," in order to make out his case, and convict me of misrepresentation, ought to have shown that the "three society bricklayers" were acting under instructions issued by the society or societies to which they belong. This he has not done; therefore the accuracy of my assertion, as far as "A Master Builder's" contradiction is concerned, continues unshaken.

To show the futility of my assailant's denial of my statement, take a precisely analogous case. Three gentlemen, members of the "Reform" or "Carlton" club, take too much wine after dinner: they go forth into the street, insult a woman and assault the police, in consequence of which conduct they get locked up for the night and fined next morning. Would it therefore follow that the object of the "Reform" or "Carlton" was to encourage drunkenness and cultivate blackguardism? Certainly not, though "A Master Builder's" logic would lead to such an inference. Trades' Unions are not, any more than the West-end aristocratic clubs, chargeable with the conduct which their members in their individual capacity may choose to pursue.

In conclusion I beg respectfully to inform my assailant of three things;—firstly, that I am not a "leader;" secondly, that matters of fact are not to be disposed of by notes of admiration; and thirdly, that even "such a leader" (as he calls me) as myself, is not to be put down by such a writer as "A Master Builder."—I am, sir, &c.;

George Potter.

P.S. Why does not "A Master Builder" attach his name when he attacks the character of a working man?—G. P.

*** We willingly enable Mr. Potter to reply to "A Master Builder," but it would be wrong if we allowed it to be supposed that we consider the reply satisfactory. What Mr. Potter stated was, he says, that "the society men did not strike against non-society men." Dozens of instances have been forwarded to us where society men *have* struck against non-society men. The fact is notorious; and his assertion, that the "Master Builder" should have given proof that the society men struck in accordance with instructions issued by the society, is altogether aside the charge.

CONVICTION FOR INTMIDATING WORKMEN.

MIDDLESEX SESSIONS.

On the 22nd the court sat specially at the Guildhall, Westminster, to hear an appeal by William Perham, a mason, against a conviction by Mr. Corrie, the police magistrate, under the 6 Geo. IV., c. 129, entitled, "An Act to repeal the Laws relating to the Combination of Workmen, and to make Provision in lieu thereof." The adjudication was a term of two months' imprisonment.

Mr. Edwin James, Q.C., Dr. Wheeler, and Mr. Gordon Allan appeared on behalf of the appellant, instructed by Mr. Roberts, of Manchester; Mr. Lush, Q.C., and Mr. Poland, instructed by Mr. Mullens, appeared in support of the conviction.

The conviction was read. It set forth, in the terms of the statute, that the defendant had endeavoured by threats to intimidate one William Jocelyn, and to deter him from continuing in the employment of Messrs. Thomas and Wilson Piper.

After several objections on the points of law had been disposed of:—

Mr. Lush stated the case. It was in reality a prosecution by Messrs. Piper, the builders, against the defendant, who was one of a class of operatives of a most useful, industrious, and meritorious description, the masons, who had taken an active part in the strike between the master builders and the workmen in the metropolis. Messrs. Piper were actuated by no vindictive feeling in the matter, they had no ill-will against the defendant, who had been in their employment, but it was necessary for the masters, while freely and willingly conceding to the men the right of combining together to regulate matters relating to their trade, also to combine if the men exceeded the proper and legitimate action of their combination so as to take away and destroy the free agency of any of their fellow men, and also to unite to protect themselves. Those who violated the law must take the consequences, and be liable to criminal proceedings. The offence imputed to the defendant was, that he had violated the law by threatening and endeavouring to coerce men whom Messrs. Piper had procured from the country to work for them in consequence of the strike in London; and if that were so, he had committed a breach of the law, and must submit to the penalty. On the strike taking place, Messrs. Piper sent one of their foremen, named Robjohn, into Devonshire to procure men, and he engaged eighteen and brought them to London. They arrived on the 18th of October at Paddington: they were watched by persons evidently on the look out to see what men came up from the country, and were followed to a publichouse in Little Britain, where the defendant Perham made his appearance. Having been in Messrs. Piper's service, the defendant knew Robjohn, and he interfered with the men, and tried to persuade them not to go to work, and stood at the door to prevent them going out of the publichouse; but they did get out, and as Robjohn was conducting his men, to provide them with lodging for the night, Perham followed and told the men they had done very wrong in coming to town to take the place of fellow-workmen on the strike, and that they had been deluded by a trick; but the men said they had agreed to work, and work they would according to the agreement they had made, which was six months' certain work, and pay at the rate of 5s. 6d. a-day. The men went on, Perham still following, and he made use of these words, "If you go to work, we shall call you 'blacks,' and when we have won the strike and gone into work, we will strike against you all over London, until you are turned out." The consequence of this was that fourteen out of the eighteen returned, or at least did not go to work at Messrs. Piper's, as they were to do on the following Monday. That, he, Mr. Lush, submitted was neither fair reasoning, exhortation, nor admonition, but a direct threat, in violation of the law, to coerce workmen not to go into employment, and, therefore, that the conviction was good, and ought to be confirmed by the Court.

The evidence having been reheard,—

Mr. Edwin James said he would address himself to the merits of the case, and would trouble the Court but with few remarks. What overt act of molestation had been proved against Perham — what violence had he been guilty of—what personal injury had he done? This was what the statute was meant to meet; but here, Perham, drinking with the men in common company along with Robjohn too, told them that if they went to work in the room of men who had struck, they would be regarded as "blacks," and struck against throughout the trade. How could that be construed into violent intimidation? It was a rule of the trade. Was it a case to which it was ever contemplated the Act should be applied? The strike was not illegal. On the contrary, combinations of workmen for the regulation of their hours of labour, their rate of pay, and other matters, were allowed and sanctioned by the law of this country; the masters too, had a right to combine if they pleased, but so long as there was no overt act of molestation on the one side or the other, there was no violation of the law. The rules of the builders' societies had never been impugned as illegal, it had been offered to submit them to the highest legal authority in the country to see if there was any regulation or principle contrary to the spirit of the law of the land and to the free rights of the artisan, and even that course had not been adopted. It had been urged by his friend that Messrs. Piper were not vindictive in issuing this prosecution: he would beg to say that since the strike had commenced, one perhaps unexampled, with all the privations and struggling necessarily attendant upon it, there had been little violation of order and propriety. The builders' society defended this case because they thought and believed sincerely and truly that the defendant had not made use of any threats which could bring him within the operation of this Act of Parliament, and he hoped the Bench he had the honour of addressing, would feel it their duty to quash this conviction.

The Magistrates then retired, and, after a short consultation, came into court, when

The Assistant-Judge said the object of the Legislature had been, that the master in the employment of his capital, and the workman in respect of his labour, which was his capital, should be free. Mr. Hume's Act repealed the old combination laws, and now masters could combine, the workmen could combine, but there must be no threats or intimidation, molestation, or violence on either side. The present Lord Cranworth, when Baron Rolfe, on the occasion of a celebrated trial in the North, expressed his opinion that workmen combined together could reasonably and peaceably persuade others to join them in carrying out their views without committing any breach of the law, but that persuasion must be reasonable and peaceable, and not assume the character of intimidation and threatening. In the first place, it was contended here that the language used by the defendant did not amount to a threat or intimidation, but was merely an admonition. Upon that point he had had the great advantage of taking the opinion of the Bench, which was a very full one, and they unanimously considered that instead of admonition, what the defendant said was a direct threat to intimidate these workmen from going into the service of the prosecutors during the strike. On the second point, as to the hiring not being complete when this occurred, he was of opinion that it was a legal hiring, and in that view the Bench unanimously concurred. Therefore, considering that the circumstances justified the magistrate's decision, the defendant would be committed to the House of Correction for two months, the sentence passed upon him.

Mr. James applied for a case upon the point as to the hiring, but

The learned Assistant-Judge said he really had no doubt about it, nor had the Bench, and could not therefore grant a case.

Application was afterwards made to Mr. Justice Wightman for a rule to bring the matter before the Court of Queen's Bench, but it was refused.

ROYAL DRAMATIC COLLEGE.

Sir,—Would you call attention to what I believe is the fact, that the tenders to build the recently-selected design are considerably *above* the sum proposed to the competitors.

The question now arises,—Will the council, in justice to the profession generally and their subscribers, at once discard this design? This has been done in several cases, where we should expect far less of justice and gentlemanly dealing than in the present instance. It remains for the other competitors to prove that they acted on a different system to that of the selected architect.

A Competitor.

Books Received.

VARIORUM.

"A Treatise on Colonial Building Stones, read at a Meeting of the Victorian Institute of Architects (July 18, 1859), by J. G. Knight, esq. President of the Society" (printed at the *Australian Builder* office, Melbourne), is a useful and interesting contribution to our colonial intelligence. Mr. Knight states that the principal building stones known to exist in the colony of Victoria are basalt—locally known as bluestone—granites, clay-slate stones, sandstones, and a few limestones. The bluestone is considered the most durable, but its deadly-lively look is against it. The granite is next in durability, and much more sightly: it abounds in many parts of the colony, though little used, from cost of working for ornamental purposes. A coarse marble is got in Adelaide. A really first-rate sandstone has not yet been found in any of the Australian colonies, although Mr. Knight instigated the Government offer of 1,000*l.* for the discovery of a superior building stone. The colonial limestones are by no means good.——A pamphlet has been issued descriptive of "Scott's Patent Generator," as "the great economizer of fuel, labour, and space, with exemption from explosion." The new steam generator consists chiefly of coils of tubes set in a conical form in the furnace, and communicating with a small vessel or boiler above for the regulation of the steam before it passes into the piston. Water is mixed with atmospheric air in the proportion of about 30 of air to 1 of water. The water is first heated to about 200 degrees by the exhaust steam from the engine or other means; and the air is heated in tubes up to 400 or 500 degrees. Both air and water are then forced by their respective pumps through finely perforated discs of wire gauze: they thus become intimately commingled, and they enter the coil in the form of mist or vapour. The coil has been previously heated, by means of the furnace, to a temperature varying from 800 to 1,000 degrees Fahrenheit; and thus steam is immediately formed in a superheated state and of great elastic force. An engine moved by this means is said to be worked at the rate of one shilling to three by the old method. —— A "Reply to Sir David Brewster's Memorial to the Treasury on the New System of Dioptric Lights," by Messrs. D. & T. Stevenson, Civil Engineers; Engineers to the Commissioners of Northern Lighthouses; has been published by Blackwood & Sons, of Edinburgh and London. The motives and actions of the late Mr. Robert Stevenson, engineer to the Northern Lighthouse Board, are said to have been grossly misrepresented by Sir D. Brewster, and this is attributed by the authors of the "Reply" to Mr. Stevenson having peremptorily refused to support or acknowledge Dr. Brewster's attempt to prove that he had anticipated Fresnel in his invention of the dioptric system of lighthouse illumination.——A "Speech of J. B. Norton, esq., Barrister-at-Law, delivered at a public meeting held at Madras on the 22nd September, 1859," on "The Trades and Professions Licensing Bill for India," has already been printed and published by Richardson, Brothers, of 23, Cornhill, London. The purpose of the tract appears to be to urge as a duty a protest to the legislative council against the proposed measure ever becoming law, and it ends with a proposal to place the matter in the hands of Mr. Bright.—— An interesting tract "On the Comparative Value of certain Salts for rendering Fabrics Non-inflammable," by Messrs. F. Versmann, F.C.S., and A. Oppenheim, A.C.S., being the substance of a paper read before the British Association at Aberdeen, has been published by Trübner & Co., of Paternoster-row. This is a subject we have occasionally drawn attention to. The investigation of